



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

#13/ Appeal
Brief
A Ford
10/16/03

In re application of:

Sharan et al.

Serial No.: 09/825,612

Filed: April 3, 2001

For: METHOD FOR PECVD DEPOSITION OF
SELECTED MATERIAL FILMS

§
§ Group Art Unit: 2829
§
§ Examiner: Lisa Kilday
§
§ Atty. Docket: 95-0716.01
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Enclosed herewith is Applicants' Appeal Brief, submitted in triplicate. The Commissioner is authorized to charge the appropriate fee under 37 C.F.R. §1.17(c) of \$320.00, as well as any other required fee, to Micron Technology, Inc. Deposit Account No. 13-3092, Order No. 95-0716.01. This transmittal is being submitted in duplicate.

Respectfully submitted,

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APPLICANTS' BRIEF ON APPEAL

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APPLICANTS' BRIEF ON APPEAL

I. REAL PARTY IN INTEREST

The Applicants, Sujit Sharan and Gurtej S. Sandhu, have assigned their interest in this application to Micron Technology, Inc.

II. RELATED APPEALS AND INTERFERENCES

Applicants are concurrently filing an Appeal Brief in further prosecution of U.S. App. Ser. No. 09/825,613, which was filed 4/03/01 and is a sibling of the currently appealed application ('613 is a continuation and this application is a divisional of U.S. App. Ser. No. 09/249,478, filed 2/12/99 and issued as U.S. Pat. No. 6,291,341).

III. STATUS OF THE CLAIMS

Claims 1-66 have been presented during prosecution of the application under appeal.

Claims 1-12, 19-21, 27, and 29-66 have been canceled.

Claims 13-18, 22-26, and 28 are pending.

Claims 13-18, 22-26, and 28 are rejected.

Claims 13-18, 22-26, and 28 are appealed.

IV. STATUS OF THE AMENDMENTS

Applicants filed no amendments subsequent to final rejection.

V. SUMMARY OF THE INVENTION

The current invention addresses methods involving interacting or combining a chemically inert gas with another material. (Specification at [0030].) In prior art interactions/combinations, the inert gas has a diluting property that inhibits reactions of the other material. (*Id.* at ¶¶ [0034];

U.S. Pat. No. 6,294,466 by Chang at col. 1, ln. 41.) In exemplary embodiments of the current invention, the inert gas has a property of a charged species producer (Specification at ¶¶ [0014], [0028], [0031], [0042]), an excitation gas (*id.* at ¶¶ [0030], [0042]), an energy-transfer gas (*id.*), and/or a collider gas (*id.* at ¶¶ [0030], [0037], [0042]).

VI. ISSUE

There is one issue for determination on appeal: whether the Examiner has failed to meet the burden for rejection under 35 U.S.C. § 102 in light of U.S. Pat. No. 6,294,466 by Chang.

VII. GROUPING

Applicants define the following group of claims for consideration upon this appeal. This group corresponds to the issue listed above.

Group I: claims 13-18, 22-26, and 28 (the claims do not necessarily fall together).

VIII. ARGUMENT

The Examiner rejected claims 13-18, 22-26, and 28 under § 102 as being anticipated by Chang (U.S. Pat. No. 6,294,466). Applicants note that the rejections in the Final Office Action appear to be taken verbatim from the previous Office Action. (*Compare* Office Action dated 4/09/03 at p. 2-4 *with* Office Action dated 9/11/02 at p. 2-4.) Accordingly, Applicants have previously argued against the rejections. (*See* Response to the Office Action dated 9/11/02, transmitted 1/13/03.) For the Board's convenience, Applicants present those arguments below and supplement them. Applicants further submit that the Examiner's response to Applicants' previously-raised arguments is insufficient to cure the defects of the rejections.

A. Applicants' previously-raised arguments demonstrate the Examiner's failure to meet the burden for rejection.

Applicants contend that the claims contain limitations that Chang fails to disclose. Independent claim 13, for example, requires a gas that functions as a chemically inert charged species producer. Claim 13 further requires an interaction of that gas and a compound. Dependent claims 14-15 incorporate these limitations and express still other limitations concerning the chemically inert charged species producer gas. Independent claim 22 requires supplying a chemically inert-excitation gas and further requires interacting that gas with another gas. Dependent claim 23 incorporates this limitation and further expressly limits the act of interacting the gases. Independent claim 24 includes an act involving a chemically inert energy-transfer gas. Dependent claims 25-26 incorporate this limitation and express still other limitations concerning interacting that gas with another. Independent claim 28 requires interacting a material with a chemically inert collider gas.

As support for anticipation, the Examiner relies on Chang's reference to argon in a plasma process that deposits titanium. For instance, the Examiner cites Chang's reference to an argon gas source (Office Action dated 4/09/03 at p. 2-3 (citing Chang's component 100d).) The Examiner also cites Chang's reference that its plasma forming gas may or may not include a flow of an inert carrier gas, such as argon. (*Id.* at p. 2 (citing Chang at col. 11, ln. 31-32); *see also* Chang at col. 11, ln. 33).) Assuming *arguendo* that such an excerpt discloses some sort of relation between Chang's argon and Chang's plasma, neither these excerpts, nor any other part of Chang, express argon's specific role as a charged species producer (as required by claims 13-15), an excitation gas (as required by claims 22-23), an energy-transfer gas (as required by claims 24-26), or a collider gas (as required by claim 28). Accordingly, such excerpts from Chang necessarily fail to disclose interaction with such gases, as required in the limitations addressed above. Rather, a careful reading of Chang as a whole discloses that Chang's argon serves to act as a carrier (col. 3, ln. 43; col. 11, ln. 33) or a pressure stabilizer (col. 10, ln. 3-11). (*See also* col. 1, ln. 41 (disclosing inert gas as a diluent).)

Further, a third excerpt cited by the Examiner discloses only the opposite of the limitations described above. Specifically, the Chang paragraph that addresses igniting a plasma (a portion of which was cited by the Examiner) discloses that it is the *RF energy* that forms the plasma. (Chang

at col. 1, ln. 64-67 (cited in the Office Action dated 4/09/03 at p. 3); *see generally* Chang at col. 1, ln. 57 – col. 2, ln. 8.) Significantly, although Chang refers generally to applying energy to “a” process gas in this paragraph, the role of argon in the manner required by the rejected claims is not specified. Moreover, it is unclear whether Chang even considers argon to be a process gas. At one point, Chang appears to distinguish argon from processes gases, which are reactive. (Chang at col. 10, ln. 3-11.)

As a result, Chang fails to disclose that its argon functions as required by claims 13-15, 22-26, and 28. Hence, Chang also necessarily fails to disclose the required interactions from those claims as well as other limitations associated with such functions.

The Examiner rejected claims 16-18 under §102 as being anticipated by the matters inherent in Chang, as purportedly demonstrated by the Muller article. However, claims 16-18 are dependent upon claims 13-15; and the rejection of claims 16-18 is premised on the notion that Chang expressly discloses (1) a chemically inert charged species producer gas, and (2) interacting that gas with a compound. (Office Action dated 4/09/03 at p. 4.) As argued above in favor of claims 13-15, Chang fails to disclose that its argon functions as a charged species producer. Therefore, Chang necessarily fails to disclose any interaction with such a charged species producer. As a result, the novelty rejections fail against claims 16-18 as well.

B. Applicants’ supplemental arguments further demonstrate the Examiner’s failure to meet the burden for rejection.

As mentioned above, the appealed claims require acts involving a charged species producer, an excitation gas, an energy-transfer gas, or a collider gas. The Examiner’s rejections are based on the assumption that Chang’s argon satisfies the claimed properties. This is despite the fact that Chang fails to express such properties.

The Examiner’s assumption demonstrates a conflict with binding case precedent, which holds that a prior art reference cannot be assumed to disclose a particular property just because it discloses a particular material or structure. (*See Crown Operations Intl. v. Solutia, Inc.*, 289 F.3d 1367, 62 U.S.P.Q.2d 1917, 1922 (Fed. Cir. 2002). A copy of *Crown* is included in an appendix to this Appeal Brief.) The relevant claim in *Crown* addressed a glass assembly including a “solar control film.” (*Id.* at 1918-19.) The specific limitation at issue concerned limiting the solar control

film's contribution of visible light reflection to no more than 2% of the total reflection from the whole glass assembly. (*Id.*) The accused infringer argued that a prior art reference disclosed the same structure, materials, composition, and thickness as the claim. (*Id.* at 1919, 1922.) The accused infringer admitted that the prior art reference failed to express the 2% reflection property. (*Id.*) Nevertheless, the accused infringer concluded that such a property is inherent given the similarity in structure, materials, and thickness between the prior art reference's disclosure and the claim. (*Id.*) In finding against the accused infringer, the Court reasoned that if the unexpressed teaching of the property were inherent in a reference, one of ordinary skill in the art would recognize the teaching's presence in that reference. (*Id.* at 1922-23.) The Court indicated that it was the accused infringer's burden to demonstrate that one of ordinary skill in the art would make such a recognition. (*See id.* at 1923.) The Court further indicated that merely pointing out the similarity in structure between the claim and prior art does not meet that burden and, in fact, is not in accordance with the Court's cases on inherency. (*See id.* at 1922.)

Applicants contend that the current facts are analogous. Each of the appealed claims require a material –specifically a gas – having a particular property. Some claims (13-18) require that the material have a property of a charged species producer. Others (claims 22-23) require that the material have a property of excitation. Claims 24-26 require a material having an energy-transfer property. Claim 28 requires a material having the property of a collider. As non-limiting support for the claims, the Specification cites argon as an exemplary material. (Specification at [0029].) Chang cites an argon structure/material in its process, as indicated previously by both Applicants and the Examiner. However, as in *Crown*, nothing in Chang's cited portions address that structure's properties as expressed in Applicants' appealed claims. Also significant in the current appeal is the fact that Chang addresses other properties of argon to the exclusion of the relevant properties. Specifically, Chang addresses argon's property as a pressure stabilizer (col. 10, ln. 3-11), a carrier in a plasma forming gas (col. 3, ln. 43; col. 11, ln. 33), and even suggests its property as a diluent (*see* col. 1, ln. 41). Chang's efforts in addressing argon's properties yet failure to express the particular properties in the appealed claims only emphasizes Chang's inability to anticipate the claims.

Even more in Applicants' favor is the fact that, unlike *Crown*'s accused infringer, the Examiner has failed to acknowledge Chang's lack of disclosure and reliance on inherency. Rather, the Examiner has simply, unilaterally, and without citing adequate support, touted

Chang's argon to be a charged species producer, an excitation gas, an energy-transfer gas, and a collider gas. However, such properties are not expressed in Chang. Further, according to **Crown**, if the claimed properties are inherent in Chang's teachings, then one of ordinary skill in the art should recognize that. (See **Crown**, 62 U.S.P.Q.2d at 1922-23.) However, it was up to the Examiner, who had the initial burden (just as **Crown**'s accused infringer did) to demonstrate such recognition from one of ordinary skill in the art. (See *id.* at 1923.) Applicants contend that the Examiner's citation to Chang's argon merely points out the similarity in structure/material between prior art and disclosed embodiments supporting the claims, which is insufficient to meet that burden and is not in accordance with binding case precedent. (See **Crown** at 1922.)

Moreover, other citations by the Examiner suffer similar problems in that they fail to support the Examiner's arguments. More specifically, as Chang fails to disclose gases with the claimed properties, Chang necessarily fails to disclose limitations concerning acts involving those gases. As a non-limiting example, dependent claim 25 indicates that claim 24's act of igniting a plasma comprises interacting combined gases. (Those combined gases comprise a metal source gas with the chemically inert energy-transfer gas.) As support for rejecting this claim, the Examiner cited Chang's col. 1, ln. 64-67. However, that excerpt merely indicates that a plasma reaches a threshold, self-sustaining density; that such a condition is known as a glow discharge; and that reaching such a stage is often referred to as "striking" or "igniting" the plasma. Applicants contend that such statements fail to address Claim 25's limitations.

Still another example of the Examiner's text failing to support the Examiner's arguments can be found in the Examiner's attempt at an inherency argument against claims 16-17. Dependent claim 16 specifies that claim 13's act of forming a product further comprises forming a metal-containing ion of a metal-containing compound. Dependent claim 17 further specifies that the act of forming a product comprises forming a metal-free ion from the metal-containing compound. The Examiner concludes that Chang inherently discloses such limitations, citing an excerpt from Muller. A careful review of that excerpt, however, demonstrates that Muller merely introduces the general concept of plasma enhanced chemical vapor deposition (PECVD). In fact, Muller seems to refute the Examiner's argument and disclose only the exact opposite of the relevant claim limitations by indicating that a plasma is a neutral mixture. Muller's electrically neutral plasma appears to be in conflict with the ions – electrically charged particles – of claims 16 and 17. Thus, at best it is unclear how the Muller excerpt supports the Examiner's

inherency argument. At worst (for the Examiner), the Muller excerpt refutes the Examiner's rejection. Either option further supports the Board's reversal of the Examiner, withdrawal of the rejection, and allowance of the claims. Moreover, since the inherency argument/Muller citation applies only to claims 16-17 (and dependent claim 18), those claims benefit from an additional reason for allowance that may not apply to the other appealed claims. As a result, the claims do not necessarily fall together.

C. Examiner's response is insufficient to cure the problems with rejection and supports allowance.

As mentioned above, the Examiner raised the latest rejections in an earlier Office Action, and Applicants have previously argued against those rejections. As a result, the Final Office Action includes a response to Applicants' arguments. Applicants contend that the Examiner's response is insufficient to cure the defects of the rejections. Applicants address each paragraph of the response separately below.

1. First paragraph

The Examiner's response begins by addressing Applicants' contention that Chang fails to disclose claim 13's "chemically inert charged species producer gas." (Office Action dated 4/9/03 at p. 4.) The Examiner concluded that Applicants' argument was moot for five reasons. However, Applicants alert the Board that the Examiner's second reason actually refutes the rejection and supports Applicants' argument. Specifically, the Examiner's second reason admits that it is Chang's RF power that produces charged species. Claim 13 requires a *gas* having a property of a charged species producer. Citing a property of Chang's RF power in no way addresses the claimed property of claim 13's gas. Moreover, Chang's attributing this property to its RF power yet failing to associate this property with its argon gas, while touting other properties of its argon gas, indicates that Chang's argon lacks the property of being a charged species producer. Hence, the Examiner's own second reason supports the Board's reversal of the Examiner.

Applicants also alert the board that the Examiner's first, third, and fourth reasons include opinions on the technology yet lack citation to concrete evidence in the record. As a result, these

reasons are legally improper in light of *In re Zurko*. (*Zurko*, 258 F.3d 1379, 59 U.S.P.Q.2d 1693 (Fed. Cir. 2001). A copy of *Zurko* is included in an appendix to this Appeal Brief.) In *Zurko*, the Patent and Trademark Office (PTO) rejected Zurko's claims based on the PTO's assumptions concerning the relevant technology. (*See id.* at 1695.) In reversing the PTO, the Court held that the PTO "cannot simply reach conclusions based on its own understanding or experience." (*Id.* at 1697.) Rather, the Court required that the PTO "point to some concrete evidence in the record" to support its findings concerning aspects of the technology. (*Id.*) The Court reasoned that to hold otherwise would render the process of appellate review a meaningless exercise. (*Id.*) The current facts are analogous: the Examiner's conclusions concerning the definition of plasma, PECVD requirements, and argon's properties are just that – mere conclusions with no citation to concrete evidence in the record. Thus, for the same reasons as in *Zurko*, such baseless conclusions are insufficient to support rejection.

The Examiner's fifth reason does contain a citation to Chang's text. However, that citation does not support the Examiner's statement. Specifically, the Examiner's fifth reason is an announcement that argon is chemically inert and acts as a charge species producer. As support, the Examiner cites Chang's column 11, lines 30-32:

such as hydrogen, is flowed into the process chamber 38,
during step 210, from which a plasma is formed at step 212.
The plasma forming gas may or may not include a flow of

Applicants note that the excerpt fails to mention argon, let alone its properties. Further, even when the text surrounding the Examiner's excerpt is considered, most of the Examiner's fifth reason is still unsupported. Such text expresses that Chang's *hydrogen* is a plasma-forming gas, with argon included with it as an inert *carrier*. (Chang at col. 11, ln. 29-33.)

Thus, given the lack of support for the Examiner in the art and in binding case precedent, the Examiner's five reasons fail to render Applicants' argument moot and fail to support the rejection. Moreover, at least the second reason actually supports Applicants' argument and renders the rejection moot.

2. Second paragraph

The next page of the Examiner's response begins by addressing Applicants' syllogism presented above and in the previous Response: because (1) claim 13 also requires an interaction of the chemically inert charged species producer gas and a compound; and (2) Chang fails to disclose the chemically inert charged species producer gas; then (3) Chang necessarily fails to disclose the claimed interaction as well. (*See part A above.*) The Examiner labels the argument moot based on Chang's col. 11, ln. 31-36. First, Applicants note that the Examiner appears to have misapplied the figure numbers to the cited gases (argon is actually element 100d, and TiCl_4 is element 100a). Second, Applicants alert the Board that the first portion of the Examiner's citation has already been addressed above in part C(1). To reiterate, Chang's col. 11, ln. 31-33 expresses that Chang's *hydrogen* is a plasma-forming gas, with argon included with it as an inert *carrier*. Further, the rest of the Examiner's latest citation merely discloses the introduction of a deposition gas. (Chang at col. 11, ln. 33-36.) Thus, the excerpt relied upon by the Examiner discloses neither a chemically inert charged species producer gas nor its interaction with a compound. As a result, Applicants submit it is the Examiner's response that is moot, fails to refute Applicants' arguments, and fails to cure the defect in the rejection.

3. Third paragraph

The next paragraph of the Examiner's response addresses Applicants' argument that Chang fails to express its argon has properties not only of a charged species producer but also of an excitation gas, an energy-transfer gas, or a collider gas, all of which limit various independent claims under appeal. (Office Action dated 4/09/03 at p. 5.) The Examiner assumed that such terms are interchangeable and were therefore already refuted by the first five reasons initially articulated in the Examiner's response.

In an attempt to support the interchangeability of the terms, the Examiner cited paragraphs 29-31 and 42 of the Specification. Applicants contend that the cited portion of the Specification actually refutes the Examiner and supports the scope of the claims. Specifically, it is noteworthy that paragraph 42 of the Specification addresses the limitations in terms of "certain exemplary embodiments," "some embodiments," and "many embodiments" of the invention. Applicants

contend that such language indicates that the invention includes within its scope not only embodiments that are relevant to all of those terms but also embodiments that are relevant to a combination of less than all of such terms as well as embodiments that are relevant to only one of such terms. Such an interpretation has the added benefit of being in accordance with the doctrine of claim differentiation. (See *Tandon Corp. v. United States Intern. Trade Comm'n*, 831 F.2d 1017, 4 U.S.P.Q.2d 1283, 1288 (Fed. Cir. 1987) (presuming a difference in meaning and scope when different words or phrases are used in separate claims); see also *id.* (acknowledging that the metes and bounds of the invention may be defined in a variety of different ways). A copy of *Tandon* is included in an appendix to this Appeal Brief.) Hence, the Examiner's assumption concerning interchangeability of the references is incorrect. Moreover, based on the reply articulated above in part C(1), the Examiner's five reasons are inapplicable against any of these limitations.

4. Fourth paragraph

In the following paragraph of the Examiner's response, the Examiner interprets Applicants as "arguing" that Chang discloses its plasma forming gas may or may not include a flow of an inert carrier gas such as argon. (Office Action dated 4/09/03 at p. 5, ¶3.) The Examiner concludes that the argument is moot. (*Id.*) Applicants alert the Board that this particular point is not an argument so much as a direct quotation from Chang itself:

[t]he plasma forming gas may or may not include a flow of an inert carrier gas, such as argon.

(Chang at col. 11, ln. 32-33; see also *id.* at col. 3, ln. 41-43.) Significantly, the Examiner relies on this excerpt throughout the Office Action. Thus, the Examiner's conclusion that this statement is moot serves to refute the Examiner's own arguments.

In attempting to support the conclusion, the Examiner first announces that Applicants have admitted Chang discloses argon is an inert gas included within the plasma forming gas. As with other statements from the Examiner, no citation for support is provided. Applicants believe that Applicants position is and has always has been that Chang expresses what has been quoted above. The Examiner's second announcement is that the claims lack a limitation requiring that a

plasma forming gas may or may not include an inert carrier gas such as argon. While true, Applicants reiterate that the claims do express limitations wherein an inert gas must have a certain property, such as a property of a charged species producer (claims 13-18), a property of excitation (claims 22-23), an energy-transfer property (claims 24-26), or a property of a collider (claim 28). Applicants further reiterate that the portion of Chang quoted above and oft-relied upon by the Examiner for rejection fails to disclose those properties. Hence, what is moot is the Examiner's announcement concerning what the appealed claims do not express. The Examiner then indicates that the claims' use of the term "comprising" allows for the use of other inert carrier gases. Applicants submit that, regardless what gases and what carriers fall within the scope of the claims, Chang still fails to disclose the properties expressed in the claims for the reasons articulated above.

5. Fifth paragraph

Starting at the bottom of page 5 of the Office Action, the Examiner accuses Applicants of merely assuming and concluding without citation that Chang does not express argon as a charged species producer, excitation gas, energy-transfer gas, or collider gas. Applicants submit that the *Examiner* has the initial burden of establishing that Chang *does* express such. Applicants further contend that, for the reasons provided above, the Examiner has failed to meet that burden. Thus, MPEP 2145 (indicating that argument does not replace evidence *where evidence is necessary*) is not relevant to this appeal, and accusations concerning baseless assumptions and conclusions are better applied to Examiner. Further, despite the Examiner's failure, Applicants have nevertheless cited concrete evidence in the record in traversal of these rejections. Specifically, Applicants have cited and quoted the very portions of Chang relied upon by the Examiner to illustrate that the claimed properties are not expressed therein. (*See* part A-C above and Response transmitted 1/13/03 at p. 2.) Applicants have also cited a portion of Chang that indicates such properties are attributable to a factor other than Chang's inert gas – namely Chang's RF energy. (*Id.* (both citing Chang at col. 1, ln. 57-col. 2, ln. 8).) Further, Applicants have cited portions of Chang that highlight other properties of its argon (pressure stabilizer, carrier, diluent) but are curiously silent concerning the properties in the appealed claims. (*Id.* ((both citing Chang at col. 3, ln. 43; col. 11, ln. 33; col. 10, ln. 3-11; and col. 1, ln. 41).) Thus,

even if the burden has shifted and it is necessary to cite evidence under MPEP 2145, Applicants have satisfied that burden.

The Examiner then repeats the conclusion that Chang discloses argon as a charged species producer, citing Chang's Abstract; column 6, lines 20-31; and column 11, lines 29-32. However, a careful reading of these excerpts demonstrates that they do not support the Examiner's conclusion. For instance, Chang's Abstract addresses argon only by disclosing that it is an inert gas that flows between the process chamber cover and a TiCl_4 flow. The disclosure concerning argon in Chang's column 6, lines 20-31 is limited to mentioning argon as a gas source for a delivery system that provides argon and other gases to a process chamber. As for Chang's column 11, lines 29-32, that excerpt has already been addressed above. To reiterate, those particular lines do not even mention argon; and even when the text surrounding the Examiner's excerpt is considered, such text expresses that Chang's *hydrogen* is a plasma-forming gas, with argon included as an inert *carrier*. Thus, there is nothing in the Chang excerpts cited by the Examiner that discloses argon as a charged species producer.

The Examiner then asserted that Chang's failure to express argon as a charged species producer, excitation gas, energy-transfer gas, or collider gas is moot because that limitation is not in the claims. Applicants reiterate that (1) the claims expressly require an inert gas that is a charged species producer, excitation gas, energy-transfer gas, or collider gas; and (2) the Examiner is arguing that Chang's argon anticipates those limitations. Hence, Chang's failure to express those properties of its argon is directly relevant to the issue on appeal.

6. Sixth paragraph

The Examiner then interprets Applicants as arguing that Chang fails to disclose that RF energy forms plasma. Applicants alert the board that this is a misinterpretation. A careful reading of Applicants' previous and current arguments reveals that Applicants are *acknowledging* that Chang's RF energy forms plasma. (See part A and C(5) above and Response transmitted 1/13/3 at p. 2 (all citing Chang at col. 1, ln. 57-col. 2, ln. 8).) Applicants' point is that Chang's attributing that property to its RF energy, combined with Chang's failure to attribute that property to its argon, demonstrates that Chang fails to disclose an inert gas having the properties expressed in the appealed claims.

7. Seventh paragraph

The Examiner next addresses Chang's ambiguity concerning whether argon is a process gas. The Examiner concluded that point is moot because that limitation is not in the claims. Applicants contend that the point is relevant in that it occurs in a paragraph of Chang that the Examiner attempts to rely upon for rejection. (*See* Chang at col. 1, ln. 57-col. 2, ln. 8; Office Action dated 4/09/03 at p. 3 (citing Chang at col. 1, ln. 64-67).) That point's relevance is further supported by the fact that it demonstrates Chang's failure to disclose the inert gas properties expressed in the appealed claims. As addressed previously, the relevant Chang paragraph discloses applying RF energy to a process gas. (Chang at col. 1, ln. 57-col. 2, ln. 8.) Other portions of Chang suggest that Chang does not consider argon to be a process gas. (*Id.* at col. 10, ln. 3-11 (distinguishing argon from processes gases, which are reactive).) Hence the Chang excerpt spanning from col. 1, ln. 57 to col. 2, ln. 8 does not appear to express applying RF energy to argon. Such a failure is further proof that Chang's argon fails to exhibit the relevant properties in the appealed claims.

8. Eighth paragraph

The final paragraph in the Examiner's response appears to be substantially similar to the first paragraph of the Examiner's response. Applicants see no need to repeat their reply and instead refer the Board to part C(1) above.

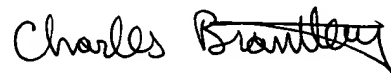
D. Conclusion

Each of the appealed claims requires an inert gas having a certain property. The claims further require particular interactions/combinations involving those gases. Applicants' citations to Chang demonstrate that, while Chang discloses argon – an inert gas, Chang fails to disclose that argon, as used in Chang's processes, exhibits the claimed properties. Rather, Chang discloses other properties of argon to the exclusion of those claimed. Hence, the Examiner has

failed to meet the burden for rejection under 35 U.S.C. §102 in light of Chang, nor could the Examiner meet that burden relying on Chang.

The Examiner's conclusions to the contrary are not supported by the Examiner's citations to Chang, assuming the Examiner provides such a citation. The Examiner often fails to provide such citations, especially in response to Applicants' previously-raised arguments. Such failures, combined with the Examiner's admissions that support patentability and refute the rejections, the Examiner's misinterpretations of Applicants' arguments, and the Examiner's misinterpretation of the Specification, result in a failure by the Examiner to render Applicant's arguments moot. The Examiner's statements also result in a failure to support the rejections and in fact support the Board's reversal of the Examiner, withdrawal of the rejections, and allowance of the claims.

Respectfully submitted,

A handwritten signature in black ink that reads "Charles Brantley". The signature is written in a cursive, slightly slanted style.

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Appendix 1: Copy of Involved Claims

13. A method of making a semiconductor device, comprising the steps of:

forming a product in a PECVD chamber through an interaction of a chemically
inert charged species producer gas and a metal-containing compound in a plasma;
and
exposing a substrate to said product.

14. The method in claim 13, wherein said step of forming a product comprises forming a product free of constituents of said chemically inert charged species producer gas.

15. The method in claim 14, wherein said step of exposing a substrate to said product further comprises forming a metal layer free of constituents of said chemically inert charged species producer gas.

16. The method in claim 15, wherein said step of forming a product further comprises forming a metal-containing ion of said metal-containing compound.

17. The method in claim 16, wherein said step of forming a product further comprises forming a metal-free ion from said metal-containing compound.

18. The method in claim 17, further comprising a step of introducing a reactant gas to said metal-containing ion; and wherein said step of exposing a substrate to said product comprises exposing said substrate to said product and to said reactant gas.

22. A method of performing a back-end-of-the-line process, comprising:
providing a semiconductor device under fabrication;
placing said device in a vacuum chamber;
supplying a metal source gas and a chemically inert-excitation gas within
said vacuum chamber; and
interacting said metal source gas and said chemically inert-excitation gas.
23. The method in claim 22, wherein said step of interacting comprises igniting a plasma.
24. A method of making a semiconductor device using PECVD comprising:
providing a semiconductor device under fabrication;
placing said device in a vacuum chamber;
forming combined gasses comprising a metal source gas with a chemically inert
energy-transfer gas;
supplying said combined gases to said vacuum chamber; and
igniting a plasma.
25. The method in claim 24, wherein said step of igniting a plasma comprises interacting
said combined gases.
26. The method in claim 25, wherein said step of interacting said combined gases comprises
producing a charged species.

28. A semiconductor processing method comprising the following steps:
- providing a semiconductor wafer;
 - subjecting said wafer to PECVD conditions in a chamber;
 - forming an ionized reactant species by interacting a metal source material with a chemically inert collider gas in said chamber; and
 - forming a metal-containing layer on said wafer from said ionized reactant species.

Appendix 2:

Crown Operations Intl. v. Solutia, Inc., 289 F.3d 1367, 62 U.S.P.Q.2d 1917 (Fed. Cir. 2002).

H

Crown Operations International Ltd.

v.

Solutia Inc.

U.S. Court of Appeals Federal Circuit

No. 01-1144

Decided May 13, 2002

PATENTS

[1] Patentability/Validity -- Anticipation -- Prior art (§ 115.0703)

Patentability/Validity -- Obviousness -- Relevant prior art -- In general (§ 115.0903.01)

Patent directed to solar and safety control glass with minimal visual distortion is not anticipated by prior art patent, since invention addresses visual distortion problem by limiting visible reflectance contribution of solar control film layer to no more than about 2 percent, whereas prior patent does not discuss or disclose 2 percent limitation, since prior reference will not be assumed to inherently contain claimed property merely because it discloses same structure, and since declaratory plaintiff has not presented sufficient evidence to rebut presumption of validity and defendant's facial evidence that prior patent does not disclose 2 percent limitation; patent is not obvious in light of prior art, since plaintiff has not shown that prior art contains teaching, suggestion, or motivation to reduce reflectance contribution to about 2 percent.

[2] Patentability/Validity -- Specification -- Enablement (§ 115.1105)

Genuine issue of fact exists as to whether patent in suit, directed to elimination of optical distortion in solar and safety control glass, is invalid for lack of enablement, since patent teaches measurement of texture of solar film layer in glass by calculating "wave index" using average amplitude and average pitch, but amplitude is not defined in patent, since person of ordinary skill in art would recognize several ways to measure amplitude, since amplitude directly impacts wave index calculation, and varying amplitude measurements produces range of wave index results, since novel aspects of invention must not be left to inference, since patent does not specify boundaries for average pitch and amplitude used to calculate wave index, leaving open possibility of range of embodiments that meet limitation but are inoperative, and since patent's rules for determining which wave peaks and valleys are small enough to be eliminated from index calculation are ambiguous.

PATENTS

Particular patents -- General and mechanical -- Safety and solar film for glass

4,973,511, Farmer, Ho, Riek, and Woodard, composite solar/safety film and laminated window assembly made therefrom, summary judgment that patent is not invalid affirmed.

5,091,258, Moran, laminate for a safety glazing, summary judgment that patent is not invalid for lack of enablement reversed.

*1918 Appeal from the U.S. District Court for the Western District of Wisconsin, Shabaz, S.J.

Action by Crown Operations International Ltd. and Marshall H. Krone against Solutia Inc. for declaratory judgment that defendant's patents are invalid. Plaintiffs appeal from grant of summary judgment in favor of defendant. Affirmed as to patent no. 4,973,511; reversed and remanded as to patent no. 5,091,258.

Joseph T. Leone and Joseph A. Ranney, of DeWitt, Ross, and Stevens, Madison, Wis., for plaintiffs-appellants.

Gregory E. Upchurch, Kenneth R. Heineman, and Dudley W. Von Holt, of Thompson Coburn, St. Louis, Mo., for defendant-appellee.

Before Lourie, Clevenger, and Gajarsa, circuit judges.

Gajarsa, J.

Crown Operations International, Ltd., and Mr. Marshall H. Krone (collectively "Crown"), appeal the decision of the United States District Court for the Western District of Wisconsin denying Crown declaratory relief that Solutia's U.S. Patent No. 4,973,511 ("the '511 patent") is invalid for lack of novelty and non-obviousness, and that Solutia's U.S. Patent No. 5,091,258 ("the '258 patent") is invalid for lack of enablement and written description. *Crown Operations Int'l, Ltd. v. Solutia, Inc.*, No. 99-C-802-S, slip op. at 8 (W.D. Wis. Aug. 30, 2000) (memorandum decision and order granting summary judgment) ("August 30 Order"); *Crown Operations Int'l, Ltd. v. Solutia, Inc.*, No. 99-C-802-S, slip op. at 24, 27 (W.D. Wis. Aug. 22, 2000) (same) ("August 22 Order"). Because we find no error in the district court's opinion with respect to the '511 patent, we affirm that portion

of the district court's decision. However, because the district court erred in its analysis of enablement for the '258 patent, and did not address the written description issue for the '258 patent, we reverse the district court's grant of summary judgment on that issue and remand for additional proceedings consistent with this opinion.

I. BACKGROUND

The patents at issue in this appeal relate to layered films used to create safety and solar control glass. An example is an automobile windshield. Most windshields have two layers of glass with a multi-layer film between the glass layers. The multi-layer film adds properties to the glass assembly, such as impact resistance or providing a conductive layer that facilitates defrosting the windshield. An inner layer of the film has solar control properties to selectively reflect, absorb (and thus convert to heat) or transmit defined percentages of certain wavelengths of light. This inner layer is called the solar control film. It is made of a substrate coated by one or more layers of metal or metallic substances. '511 patent, col. 3, l. 64 to col. 4, l. 2. Typically, manufacturers laminate the solar control film between layers of plasticized polyvinyl butyral ("PVB") (sometimes called the "safety film") in a process known as encapsulation. Then, the encapsulated solar control film is sandwiched between two pieces of glass for a final assembly of multi-layer glass with safety and solar control properties.

A. The '511 Patent

The '511 patent is directed to the problem that the metal-coated substrate, *i.e.*, solar control film, tends to wrinkle during encapsulation causing visual distortions. The '511 patent claims to mask the wrinkles from detection by the human eye by limiting to two percent or less the visible light reflection contribution of the solar control film compared to reflection from a complete assembly of glass, PVB and solar control film. '511 patent, col. 4, ll. 46-49, col. 8, l. 66 to col. 9, l. 6, col. 14, l. 67 to col. 15, l. 2. Figure 1 from the '511 patent, set forth below, shows the layers in a complete assembly.

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The complete safety and solar control glass assembly 10 includes two outer glass layers 28 & 30, PVB layers 22 & 23, and the solar control film 20. The solar control film is comprised of a substrate layer 16 and

solar control coating 18. '511 patent, col. 3, ll. 41-53, col. 7, ll. 2-4, col. 10, l. 15. Figure 3 from the '511 *1919 patent, set forth below, shows the sub-layers of the solar control coating 18.

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Layer 18 is made of multiple sub-layers. Layers 34 and 36 are metal oxide, and layer 38 is metal. '511 patent, col. 5, ll. 12-14. In addition, the '511 patent notes that "[p]rior automotive windshields have visible light reflection contributions for their solar films of three percent or greater." Further, it relates that the primary method of achieving a low solar control film reflectance contribution is by providing a specially-designed solar coating. '511 patent, col. 4, ll. 56-65.

On December 16, 1999, Crown sued Solutia (the "Initial Complaint"), seeking, among various other relief, a declaration that the '511 patent was invalid for anticipation and obviousness. Upon the parties' cross-motions for summary judgment, the district court found the '511 patent not anticipated and not invalid for obviousness. *August 22 Order* at 24, 27. We discuss herein only those portions of the *August 22 Order* relevant to the issues on appeal, which relate solely to the summary judgment finding that the '511 patent was not invalid on the grounds of anticipation and obviousness.

Claim 1, the only independent claim of the '511 patent, is set forth below, with the element numbers from Figure 1 inserted into the claim.

1. A composite solar/safety film [24] for use in a laminated window assembly [10] comprising:

a flexible, transparent plastic substrate layer [16] having a carrier surface and an opposing back surface;

a multilayer solar control coating [18] on said carrier surface, said coated substrate defining a solar control film [20]; and

at least one flexible, transparent, energy absorbing plastic safety layer [23 and/or 22] bonded to a surface of said solar control film;

wherein said solar control film contributes no more than about 2% visible reflectance, based on total visible incident radiation, in a laminated window assembly containing said composite solar/safety film laminated to at least one rigid transparent member [30

and/or 28].

'511 patent, col. 14, l. 57 to col. 15, l. 4 (emphasis added and emphasized numbers added to identify elements shown in Figure 1 above).

Crown argued that U.S. Patent No. 4,017,661 to Gillery (the "Gillery patent") anticipates the '511 patent. The district court held otherwise, because, while the Gillery patent discloses the first three limitations of claim 1 of the '511 patent, it does not disclose the two percent visible reflectance limitation. The court found that neither the Gillery patent claims nor its description expressly disclose a two percent limit on reflectance contribution from the solar control film layer. Crown argued that the two percent limitation was inherently present in the Gillery patent's teachings because the Gillery patent disclosed an assembly with PVB layers, substrate layer, and substrate metal-coating--arguably of the same composition and thickness of the films disclosed by the '511 patent. Thus, Crown argued, because the structure, thickness and materials of the assembly were the same or within the same range(s), the Gillery patent must inherently disclose a two percent limitation. The district court rejected this argument because it found that none of the embodiments disclosed by the Gillery patent meet the two percent visible light reflectance limit. [FN1]

In its *August 22 Order*, the district court also held that the '511 patent was not rendered invalid for obviousness by Gillery or the other prior art cited by Crown because no prior art discloses: (i) that reflectance below two percent will mask wrinkles; (ii) a solar control film layer with reflectance below two percent; or (iii) any suggestion, motivation or teaching to reduce solar control film visible light reflectivity below two percent. Although the prior art generally sought to reduce visible light reflectivity, it also taught disadvantages of a very thin metal-coating on the substrate, including sacrificing infrared reflectivity. Thus, it taught that the proper compromise to *1920 achieve the conflicting goals of infrared (non-visible light) reflectance, visible light transmission and conductivity was a solar control film with a visible light reflectivity greater than two percent.

B. The '258 Patent

The '258 patent is directed at eliminating optical distortion, called "applesauce," in safety and solar control glass assemblies of the type discussed above for the '511 patent. The '258 patent discloses a method

to control distortion otherwise caused by the safety and solar film layer by measuring and controlling the texture of the surface of the PVB layers. The method expresses texture using a "wave index" and a "roughness value." The wave index calculation is at issue in this appeal. Wave index indicates the relative waviness of the surface of the PVB. Determining wave index involves measuring the surface of the PVB and then aggregating the measurements into a single number, the wave index, through a calculation purportedly described in the '258 patent.

The '258 patent directs one to use an instrument to physically measure the waviness of the surface of the PVB and capture the measurement into an electronic "trace line" representing the contours of the PVB surface. '258 patent, col. 7, ll. 54-65. Since the "trace line" is stored electronically, a computer program is used to calculate wave index from the trace. Three figures from the '258 patent, given below, provide examples of PVB surface trace lines.

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The rules for calculating the wave index implement a "smoothing" function. The smoothing process seeks to eliminate minor inflection points (peaks or valleys) to simplify the calculation of wave index. '258 patent, col. 7, l. 66 to col. 8, l. 2.

In the Initial Complaint, Crown sought a declaration that the '258 patent was invalid for anticipation and obviousness. Then, on May 26, 2000, Crown amended the complaint (the "Amended Complaint") to additionally claim in Count VI that the '258 patent is invalid under 35 U.S.C. § 112, first paragraph, because it lacked enablement and written description due to ambiguities in the disclosed wave index calculation. In its *August 22 Order*, the district court found the '258 patent not anticipated and not invalid for obviousness. *August 22 Order* at 28-29.

With respect to Count VI of Crown's amended complaint, Solutia moved for summary judgment on Crown's enablement and written description claim. Crown opposed Solutia's summary judgment motion, arguing that the '258 patent did not meet the enablement and written description requirements. The district court found the '258 patent not invalid for lack of enablement, but did not discuss in its opinion the written description requirement. *August 30 Order* at 8-13. We discuss herein only those portions of the *August 30 Order* relevant to the issues on appeal,

which relate to summary judgment finding the '258 patent not invalid on the grounds of enablement and the procedural disposition of the written description issue.

Claim 1 of the '258 patent is set forth below. In the language of this claim, "laminate" refers to the complete glass, PVB and solar control film assembly, and "functional performance layer" refers to the solar control coating. '258 patent, col. 3, ll. 45-65.

1. A laminate which is substantially free of reflected distortion when used in a safety glazing comprising:

a transparent, thermoplastic substrate layer, optionally surface treated or coated, bearing one or more functional performance layers; and

at least one layer of plasticized polyvinyl butyral bonded on one side to a functional performance layer or the substrate layer and having a roughened deairing surface on its other side characterized by a roughness value, Rz, of at least 10 micrometers;

said at least one plasticized polyvinyl butyral [PVB] layer, before bonding to the substrate layer or functional performance layer, *possessing low surface waviness on each side characterized by a wave index *1921 value, WI, of less than 15,000 square micrometers.*

'258 patent, col. 12, ll. 2-16 (emphasis added).

Crown argued that the rules disclosed by the '258 patent for calculating wave index are not sufficiently precise to enable a person of ordinary skill in the art to practice the '258 patent without undue experimentation. The wave index calculation as described by the '258 patent is set forth below.

In this regard, considering the waviness profile as a series of peaks and valleys, the smoothing rules of the program consider an inflection point to be a true peak or valley if it is: i) at least 100 micrometers away from the immediately preceding prior peak or valley and ii) at least 0.5 micrometer above or below the immediately preceding prior peak or valley, a valley being at least 0.5 micrometer below the immediately preceding prior peak. Pitch (P) is the distance between one valley and the next valley or in other words across the base of a peak. Average amplitude (H avg) and average pitch (P avg) are determined by the program for the smoothed trace of ten 12.5 mm tracing lengths (the second five lengths being 90o to the first five

lengths). From the average of the averaged H's and P's, a WI value is computed from the equation: Wave Index (WI) = (H avg) x (P avg) where H avg and P avg are in microns.

'258 patent, col. 8, ll. 3-19.

Crown asserted that according to the disclosed wave index "calculation," one of ordinary skill in the pertinent art would not know whether to instruct the smoothing program to disregard a peak by comparing it to an immediately preceding peak, or to a valley. The district court held that common sense and the clarifying clause "a valley being at least 0.5 micrometer below the immediately preceding prior peak" defeated Crown's argument. Thus, the district court held that the alleged grammatical ambiguities in the rules disclosed for calculating wave index did not invalidate the patent for lack of enablement.

Crown timely appealed the district court's two orders, raising the issues of anticipation and obviousness of the '511 patent, and lack of enablement and written description of the '258 patent. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

II. STANDARD OF REVIEW

We review a district court's grant of summary judgment without deference. *Atmel Corp. v. Info. Storage Devices, Inc.*, 198 F.3d 1374, 1378, 53 USPQ2d 1225, 1227 (Fed. Cir. 1999). Summary judgment is appropriate when the moving party demonstrates that "there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law." Fed. R. Civ. P. 56(c); *Celotex Corp. v. Catrett*, 477 U.S. 317, 322-23 (1986). On summary judgment, the evidence must be viewed in the light most favorable to the party opposing the motion, *Poller v. Columbia Broad. Sys., Inc.*, 368 U.S. 464, 473 (1962), with doubts resolved in favor of the nonmovant, *Cantor v. Detroit Edison Co.*, 428 U.S. 579, 582 (1976); *Transmatic, Inc. v. Gulton Indus., Inc.*, 53 F.3d 1270, 1274, 35 USPQ2d 1035, 1038 (Fed. Cir. 1995). Once the moving party has satisfied its initial burden, the opposing party must establish a genuine issue of material fact and cannot rest on mere allegations, but must present actual evidence. *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986). Issues of fact are genuine only "if the evidence is such that a reasonable jury could return a verdict for the nonmoving party." *Id.* A disputed fact is material if it might affect the outcome of the suit such that a finding of that fact is necessary and relevant to the

proceeding. *Id.*; *General Mills, Inc. v. Hunt-Wesson, Inc.*, 103 F.3d 978, 980, 41 USPQ2d 1440, 1442 (Fed. Cir. 1997).

A patent is invalid for anticipation when the same device or method, having all of the elements contained in the claim limitations, is described in a single prior art reference. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 894, 221 USPQ 669, 673 (Fed. Cir. 1984). An anticipating reference must describe the patented subject matter with sufficient clarity and detail to establish that the subject matter existed in the prior art and that such existence would be recognized by persons of ordinary skill in the field of the invention. See *In re Spada*, 911 F.2d 705, 708, 15 USPQ 1655, 1657 (Fed. Cir. 1990); *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 678, 7 USPQ2d 1315, 1317 (Fed. Cir. 1988).

Obviousness is a legal conclusion based on underlying facts of four general types, all of *1922 which must be considered by the trier of fact: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) any objective indicia of nonobviousness. See *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 [148 uspq 459] (1966); *Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1270, 20 USPQ2d 1746, 1750-51 (Fed. Cir. 1991); *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1566-68, 1 USPQ2d 1593, 1594 (Fed. Cir. 1987).

"Determination of obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention." *ATD Corp. v. Lydall, Inc.*, 159 F.3d 534, 546, 48 USPQ2d 1321, 1329 (Fed. Cir. 1998). There must be a teaching or suggestion within the prior art, within the nature of the problem to be solved, or within the general knowledge of a person of ordinary skill in the field of the invention, to look to particular sources, to select particular elements, and to combine them as combined by the inventor. See *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 665, 57 USPQ2d 1161, 1167 (Fed. Cir. 2000); *ATD Corp.*, 159 F.3d at 546, 48 USPQ2d at 1329; *Heidelberger Druckmaschinen AG v. Hantscho Commercial Prods., Inc.*, 21 F.3d 1068, 1072, 30 USPQ2d 1377, 1379 (Fed. Cir. 1994) ("When the patented invention is made by combining known components to achieve a new system, the prior art must provide a suggestion or

motivation to make such a combination.").

The written description inquiry is a factual one and must be assessed on a case-by-case basis. See *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1561, 19 USPQ2d 1111, 1116 (Fed. Cir. 1991) (quoting *In re Smith*, 458 F.2d 1389, 1395, 173 USPQ 679, 683 (CCPA 1972) ("Precisely how close the original description must come to comply with the description requirement of § 112 must be determined on a case-by-case basis.")). In order to satisfy the written description requirement, the disclosure as originally filed does not have to provide in haec verba support for the claimed subject matter at issue. See *Fujikawa v. Wattanasin*, 93 F.3d 1559, 1570, 39 USPQ2d 1895, 1904 (Fed. Cir. 1996). Nonetheless, the disclosure must convey with reasonable clarity to those skilled in the art that the inventor was in possession of the invention, *Vas-Cath Inc.*, 935 F.2d at 1563-64, 19 USPQ2d at 1116-17, although we have also clarified that the possession test alone is not always sufficient to meet the written description requirement, *Enzo Biochem, Inc. v. Gen-Probe Inc.*, No. 01-1230, 2002 WL 487156, at *7 (Fed. Cir. Apr. 2, 2002). As such, "the written description requirement is satisfied by the patentee's disclosure of 'such descriptive means as words, structures, figures, diagrams, formulas, etc., that fully set forth the claimed invention.'" *Enzo Biochem*, 2002 WL at *7 (quoting *Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997)). Put another way, one skilled in the art, reading the original disclosure, must reasonably discern the limitation at issue in the claims. *Waldemar Link GmbH & Co. v. Osteonics Corp.*, 32 F.3d 556, 558, 31 USPQ2d 1855, 1857 (Fed. Cir. 1994).

Whether a claim is enabled under 35 U.S.C. § 112, first paragraph is a question of law, although based upon underlying factual findings. See *PPG Indus., Inc. v. Guardian Indus. Corp.*, 75 F.3d 1558, 1564, 37 USPQ2d 1618, 1623 (Fed. Cir. 1996); *In re Goodman*, 11 F.3d 1046, 1049-50, 29 USPQ2d 2010, 2013 (Fed. Cir. 1993).

III. DISCUSSION

A. The '511 Patent

On appeal, Crown describes various purported errors in the district court's analysis of the validity of the '511 patent. Despite Crown's contentions, we ascertain no error requiring reversal of the district court's determination of validity over Crown's claims of anticipation and obviousness.

] Regarding alleged anticipation by the Gillery patent, on its face the Gillery patent does not disclose or discuss a two percent limitation for the reflectance contribution of the solar control film. Crown maintains that the '511 patent merely claims a preexisting property inherent in the structure disclosed in the prior art. Crown urges us to accept the proposition that if a prior art reference discloses the same structure as claimed by a patent, the resulting property, in this case, two percent solar control film reflectance, should be assumed. We decline to adopt this approach because this proposition is not in accordance with our cases on inherency. If the two percent reflectance limitation is inherently *1923 disclosed by the Gillery patent, [FN2] it must be necessarily present and a person of ordinary skill in the art would recognize its presence. *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999); *Continental Can*, 948 F.2d at 1268, 20 USPQ2d at 1749. Inherency "may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Id.* at 1269, 20 USPQ2d at 1749 (quoting *In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981)).

In arguing inherent disclosure of the two percent limitation in the Gillery patent, Crown bears an evidentiary burden to establish that the limitation was necessarily present. [FN3] The moving party in a summary judgment motion has the burden to show "that there is an absence of evidence to support the non-moving party's case;" the non-moving party must affirmatively demonstrate by specific factual allegations that a genuine issue of material fact exists for trial. *Celotex Corp. v. Catrett*, 477 U.S. 317, 322-23 (1986). A patent enjoys a presumption of validity, *see* 35 U.S.C. § 282, which can be overcome only through clear and convincing evidence, *see United States Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1563, 41 USPQ2d 1225, 1232 (Fed. Cir. 1997). Given the presumption of validity afforded the '511 patent, Crown has failed to meet its burden because it has not presented sufficient evidence to rebut the facial evidence offered by Solutia that the Gillery patent does not disclose the two percent limitation. *See Eli Lilly & Co. v. Barr Lab. Inc.*, 251 F.3d 955, 962, 58 USPQ2d 1869, 1874 (Fed. Cir. 2001) ("[A] moving party seeking to have a patent held not invalid at summary judgment must show that the nonmoving party, who bears the burden of proof at trial, failed to produce clear and convincing evidence on an essential element of a defense upon which a reasonable jury could

invalidate the patent."); *In re Robertson*, 169 F.3d at 745 (recognizing that extrinsic evidence may be required to establish inherency). Instead, Crown offers only an assumption and its own contentions. [FN4]

Crown also argues that the district court erred by comparing reflectance values in the Gillery patent to non-corresponding values in the '511 patent. *August 22 Order* at 23-24. While perhaps the district court could have been more careful to explain the basis of its comparison, on a close reading of the district court's analysis we find that the alleged improper comparison only supported the district court's primary point - that no embodiment of the Gillery patent disclosed the two percent limitation, a conclusion that Crown has not shown to be in error.

Finally, Crown argues that various prior art references invalidate the '511 patent as obvious in view of such prior art. Crown's arguments lack merit because it has not shown that the prior art contains a teaching, suggestion or motivation to reduce the reflectance contribution of the solar control film to "no more than about two percent," and the district court properly concluded that there was no such teaching, suggestion or motivation in the prior art cited by Crown. *See Ruiz*, 234 F.3d at 665, 57 USPQ2d at 1167; *In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998).

B. The '258 Patent

On appeal, Crown argues that the district court erred in analyzing the impact of the ambiguities in the wave index calculation on the enablement requirement for the '258 patent. In *1924 addition to its enablement attack, Crown also argues that the '258 patent does not meet the written description requirement of § 112, first paragraph.

The two requirements, while related and springing from the same factual predicates, [FN5] each carry a separate purpose. The purpose of the enablement requirement is to "ensure[] that the public knowledge is enriched by the patent specification to a degree at least commensurate with the scope of the claims." *Nat'l Recovery Techs., Inc. v. Magnetic Separation Sys.*, 166 F.3d 1190, 1196, 49 USPQ2d 1671, 1675 (Fed. Cir. 1999). One of our predecessor courts has held the enablement and written description requirements to be separate and distinct, and has held that a "specification may contain a disclosure that is sufficient to enable one skilled in the art to make and use the invention and yet fail to comply with the description of the invention

requirement." *In re Barker and Pehl*, 559 F.2d 588, 591, 194 USPQ 470, 472 (CCPA 1977). Subsequently, this court has held that the purpose of the written description is distinct from merely explaining how to make and use the invention. *See Enzo Biochem*, 2002 WL at *7-8; *Vas-Cath*, 935 F.2d at 1563-64, 19 USPQ2d at 1117. In light of the odd procedural setting of the written description issue in this appeal, our disposition of this appeal based on enablement, and given that the two requirements are distinct and each are necessary, we do not reach the written description issue except to note that it appears to remain available for adjudication or disposition by the district court on remand. [FN6]

Turning to the enablement issue, we agree with Crown that the ambiguities and lack of specified boundary conditions, and Crown's proffered evidence concerning the same, raise a genuine issue of material fact as to whether a person of ordinary skill in the pertinent art could make or use the invention of the '258 patent [FN7] without undue experimentation. *White Consol. Indus. v. Vega Servo-Control*, 713 F.2d 788, 791, 218 USPQ 961, 963-64 (Fed. Cir. 1983). The district court found otherwise. However, it appears not to have considered the statements of Crown's expert concerning the effect of unspecified boundary conditions on the calculation of wave index.

] Following the reasoning of the district court, Solutia argues that a person of ordinary skill in the pertinent art could overcome any ambiguities in the wave index calculation without undue experimentation by testing a limited number of possibilities for computing the wave index. In response, Crown offers statements of its expert that the '258 patent does not define amplitude and that a person of ordinary skill in the art would not know whether to measure amplitude: (i) from a centerline running horizontally through the "middle" of the trace; (ii) from "peak-to-peak," i.e., from the bottom of a valley to the top of a peak; or (iii) from some other baseline or reference running horizontally somewhere through the trace. On its face, the '258 patent does not define amplitude. However, average amplitude directly impacts the wave index calculation because wave index is the result of multiplying average amplitude by average pitch. Simply put, the wave index calculation would produce two separate numbers *1925 if calculated with a centerline versus a "peak-to-peak" amplitude. Worse yet, a range of various wave index values are possible for amplitude baselines running horizontally somewhere through the trace at various locations. To

show that the wave index calculation is enabled, Solutia cites various details from the '258 patent concerning how to perform the test to generate a trace of the PVB surface to calculate wave index. However, Solutia does not present sufficient evidence to rebut Crown's demonstration of the amplitude ambiguity in the wave index calculation. This is so because: (i) the amplitude is a direct input to the critical claim limitation, a wave index of less than 15,000 square micrometers; and (ii) the novel aspects of the invention must be disclosed and not left to inference, that is, a patentee may not rely on the inference of a person of ordinary skill in the pertinent art to supply such novel aspects. *See Genentech Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1366, 42 USPQ2d 1001, 1005 (Fed. Cir. 1997) (stating that the knowledge of a hypothetical person of ordinary skill in the art cannot be used to supply the patentable aspects of the invention).

Compounding the amplitude ambiguity, Crown also notes that the wave index is the result of two independently varying, unbounded terms: average pitch and average amplitude. On its face, this does not seem to be a problem. However, Crown's expert noted that because boundary conditions are not specified, the claim covers inoperative embodiments. For example, a wave index of 15,000 square micrometers results from an average height of 1000 micrometers multiplied by an average pitch of 15 micrometers. Yet, according to Crown's expert, an average height of 1000 micrometers would not be acceptable for the PVB. As with the amplitude ambiguity, the problem goes well beyond this single example because a full range of resulting inoperative embodiments are possible for values of average height and average pitch that, when multiplied, produce a wave index value that meets the limitation of the claim. Such inoperative embodiments do not necessarily invalidate the claim. *See Atlas Powder Co. v. E.I. du Pont de Nemours & Co.*, 750 F.2d 1569, 1576-77, 224 USPQ 409, 414 (Fed. Cir. 1984); *In re Cook*, 439 F.2d 730, 735, 169 USPQ 298, 302 (CCPA 1971) (noting that although claims may read on some inoperative embodiments, this does not necessarily invalidate the claim if the necessary information to limit the claims to operative embodiments is known to a person of ordinary skill in the art). [FN8] However, the inoperative embodiments support Crown's assertion that there is a genuine issue of material fact with respect to enablement. *See Atlas Powder*, 750 F.2d at 1576-77; *see also Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1358-59, 52 USPQ2d 1029, 1034-35 (Fed. Cir. 1999) (holding that the district court failed in its claim construction to

consider the effect of inoperative embodiments on invalidity due to lack of enablement). [FN9]

Further compounding the ambiguities with the wave index rules, the '258 patent's rules for determining which inflection points are "true" inflection points additionally support Crown's argument that it has raised a genuine issue of material fact. Crown demonstrated in various ways through its experts and arguments the potential indeterminacy in the rules. Solutia's expert admitted that there was some ambiguity in the rules with respect to whether a preceding peak or valley was the reference point in selecting a "true" peak or valley.

Solutia argues that even if the disclosed wave index calculation has ambiguities and is indeterminate, a person of ordinary skill in the pertinent art would be able to make and use the invention with some experimentation, but less than "undue" experimentation. Solutia argues that such a skilled person would only have to try two possibilities for amplitude, centerline and "peak- to-peak," and that experimenting to discover which of two possibilities to use is well within the boundary of undue experimentation. Crown counters that the amplitude ambiguity and potential inoperative embodiments, combined with the ambiguities in the smoothing rules, seems to suggest *1926 a wide range of possibilities which one must try. [FN10] With this wide range of possibilities, we agree that Crown has raised a genuine issue of material fact as to the amount and type of experimentation required, facts that will determine whether such experimentation is undue. *See Enzo Biochem Inc., v. Calgene Inc.*, 188 F.3d 1362, 1371, 52 USPQ2d 1129, 1135-36 (Fed. Cir. 1999) (holding that a reasonable amount of experimentation does not invalidate a patent, but undue experimentation does invalidate, and holding that the *Wands* factors, which determine whether a patent's disclosure is insufficient such that the experimentation required would be undue, apply to inter partes litigation). [FN11] While ultimately a trier of fact may reach the conclusion that any required experimentation is not undue, Crown has shown that sufficient potential for undue experimentation exists such that disposal on summary judgment is improper.

CONCLUSION

Because we hold that the '511 patent has not been shown to be invalid due to anticipation or obviousness and that a genuine issue of material fact exists with respect to facts underlying the determination of

enablement for the '258 patent, we affirm-in-part and reverse-in-part the district court's decision and remand for additional proceedings consistent with this opinion.

**AFFIRMED-IN-PART, REVERSED-IN-PART, AND
REMANDED.**

COSTS

Each party bears its own costs.

FN1. The district court, applying a similar analysis, also found that UK Patent Application GB 2 057 355 (the "UK patent") did not anticipate the '511 patent because it did not have the two percent limitation.

FN2. In order to claim "equivalent structure" between the Gillery patent and the '511 patent, Crown's inherency argument rests on a precondition of its own making - that the Gillery patent discloses use of TiO₂, even though it specifies TiO_x, where x is greater than 1.0 but less than 2.0. Although Crown vigorously argues this point, we do not reach this issue because even if Crown is correct that the structures are equivalent, Crown's inherency argument fails for the reasons set forth herein.

FN3. Crown's reliance on *Pall Corp. v. Micron Separations, Inc.*, 66 F.3d 1211, 36 USPQ2d 1225 (Fed. Cir. 1995), and *O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576, 42 USPQ2d 1777 (Fed. Cir. 1997), to characterize the two percent limitation as a "performance limitation" similar to the claim terms at issue in those cases is unpersuasive and overbroad. Respectively, *Pall* and *Tekmar* dealt with the claim terms "skinless" and "passage." Beyond the readily apparent difference between these potentially broad terms and the precise specification of a two percent limit in the '511 patent, characterizing a claim limitation as a "performance characteristic" is not helpful as to whether the "necessarily present" requirement of inherency is met.

FN4. As indicated by this Court's questions at oral argument concerning the seemingly direct route to prove that the Gillery patent contains the two percent limitation--implementing an embodiment of the Gillery patent and testing it--this Court finds puzzling Crown's reluctance regarding this approach to generate extrinsic proof that the Gillery patent inherently meets the two percent limitation.

FN5. Also springing from these same underlying factual predicates is the § 112, second paragraph, definiteness requirement. This requirement is distinct from the enablement and description requirements, which arise from § 112, first paragraph.

[D]efiniteness and enablement are analytically

distinct requirements, even though both concepts are contained in 35 U.S.C. § 112. The definiteness requirement of 35 U.S.C. § 112, ¶ 2 is a legal requirement, based on the court's role as construer of patent claims . . . Definiteness requires the language of the claim to set forth clearly the domain over which the applicant seeks exclusive rights. . . . The test for whether a claim meets the definiteness requirement is "whether one skilled in the art would understand the bounds of the claim when read in light of the specification."

Process Control Corp., 190 F.3d at 1358 n.2, 52 USPQ2d at 1034 n.2 (internal citations omitted). See also 3 Donald S. Chisum, *Chisum on Patents*, § 8.03 at 8-14(2001) (noting the difference between the requirements of "definiteness, which claims must meet, from the requirements of enablement, which the disclosures of the specification must meet").

FN6. Based on the record before us, the written description issue has the following procedural posture: (i) Crown's Count VI of its amended complaint raised the written description issue; (ii) Solutia's summary judgment motion argued that the '258 patent met the written description requirement; (iii) in opposition Crown argued that the written description requirement was not met; (iv) the district court did not dispose of the written description issue or discuss the issue in its opinion in a way that enables our review; and (v) Crown preserved the written description issue in its appeal to this court and thus has not waived its further adjudication on remand.

FN7. All seventeen claims of the '258 patent refer to wave index, thus they all stand or fall together.

FN8. The court in *In re Cook* further notes that a claim may be invalid if it reads on significant numbers of inoperative embodiments. *In re Cook*, 439 F.2d at 734, 169 USPQ at 301-02 (citing *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 336 U.S. 271, 276-77, 80 USPQ 451, 453 (1949)). See also *In re Moore*, 439 F.2d 1232, 1236, 169 USPQ 236, 239 (CCPA 1971) (noting that the question is whether the scope of enablement conveyed by the disclosure to a person of ordinary skill in the art is commensurate

with the scope of protection taught by the claims); *Chisum*, § 7.03[7][a] at 7-108 & n.6.

FN9. The inoperative embodiment inquiry informs the enablement inquiry; they are not the same inquiry. *Nat'l Recovery Techs.*, 166 F.3d at 1196, 49 USPQ2d at 1676.

FN10. We note that the specification for the '258 patent states that in the disclosed embodiment the wave index is calculated using a software program running on a personal computer being fed the trace line. '258 patent, col. 7, ll. 64-68. Undoubtedly, Solutia took care to ensure that the program contained the necessary boundary conditions and other information to calculate wave index to practice the invention. It appears, however, that Solutia took substantially less care in transcribing the information from the program into the specification's rules for calculating wave index. This incongruity will be relevant to the question of enablement upon remand. See *Chisum*, § 7.03[4][e] at 7-86 & n.77 ("A specification that claims an invention requiring implementation through computer software but fails to set forth the details of computer programming may present issues of whether the experimentation required to write the programming is reasonable or unreasonable.") (summarizing the teachings of various cases).

FN11. The *Wands* factors are:

(1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.

FN11. *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988).

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END OF DOCUMENT

Appendix 3:

In re Zurko, 258 F.3d 1379, 59 U.S.P.Q.2d 1693 (Fed. Cir. 2001).

Briefs and Other Related Documents

In re Zurko

U.S. Court of Appeals Federal Circuit

No. 96-1258

Decided August 2, 2001

PATENTS

[1] Patentability/Validity -- Obviousness -- Combining references (§ 115.0905)

JUDICIAL PRACTICE AND PROCEDURE

Procedure -- Judicial review -- Standard of review -- Patents (§ 410.4607.09)

Decision of Board of Patent Appeals and Interferences sustaining obviousness rejection of patent application for method of improving security in computer system is reversed, even though board's factual findings underlying its determination are reviewed under "substantial evidence" standard, since prior art references relied upon by board do not teach limitation requiring communications between user and "trusted" environment along "trusted" path, and since deficiencies of references cannot be remedied by reliance upon additional combination of alternative references cited for first time on appeal, or by board's general conclusion, unsupported by evidence in record, that requiring communication with trusted environment over trusted path would be "basic knowledge" or "common sense" to person of ordinary skill in art; although board's expertise alone may provide sufficient support for conclusions as to peripheral issues, its core factual findings in patentability determinations must be supported by concrete evidence in record.

On remand from the U.S. Supreme Court.

Patent application of Mary E. Zurko, Thomas A. Casey Jr., Morie Gasser, Judith S. Hall, Clifford E. Kahn, Andrew H. Mason, Paul D. Sawyer, Leslie R. Kendall, and Steven B. Lipner, serial no. 07/479,666 (method for improving security in a computer system). Board of Patent Appeals and Interferences sustained examiner's rejection of application under 35 U.S.C. § 103. The U.S. Court of Appeals *1694 for the Federal Circuit reversed on appeal (42 USPQ2d 1476). On rehearing en banc, the Federal Circuit held (46 USPQ2d 1691) that proper standard of review for fact findings underlying patentability determinations by

Patent and Trademark Office is "clearly erroneous" standard, rather than more deferential standard found in Administrative Procedure Act. The U.S. Supreme Court reversed the Federal Circuit's en banc decision and remanded, holding (50 USPQ2d 1930) that PTO's findings of fact must be reviewed under either "substantial evidence" or "arbitrary and capricious" APA standards of review. On remand, the Federal Circuit again reverses board's decision.

Linda Moncys Isacson, associate solicitor, John M. Whealan, solicitor, and Kenneth R. Corsello and Thomas J. Finn, associate solicitors, U.S. Patent and Trademark Office, Arlington, Va., for Commissioner of Patents and Trademarks.

John F. Sweeney, Michael O. Cummings, Jon T. Hohenthanner, Israel Blum, Steven F. Meyer, and Brenda Pomerance, of Morgan & Finnegan, New York, N.Y.; Irene Kosturakis and Russell T. Wong, of Compaq Computer Corp., Houston, Texas; Ernest Gellhorn, Washington, D.C.; Janice M. Mueller, of Suffolk University Law School, Boston Mass.; Ronald C. Hudgens, of Digital Equipment Corp., Maynard, Mass., for Mary E. Zurko et al.

Before Newman, circuit judge, Archer, senior circuit judge, and Michel, circuit judge.

Archer, S.J.

This case is before us on remand from the Supreme Court of the United States. *Dickinson v. Zurko*, 527 U.S. 150, 50 USPQ2d 1930 (1999) (" *Zurko III*"). In *Zurko III*, the Court reversed our judgment and remanded the case because we had reviewed the factual findings of the Board of Patent Appeals and Interferences ("Board") for clear error, an incorrect standard of review.

The Board decision at issue, *Ex parte Zurko*, No. 94-3967 (Bd. Pat. Apps. & Int. Aug. 4, 1995), sustained the rejection of U.S. Patent Application No. 07/479,666 ("the '666 application") under 35 U.S.C. § 103 (1994). In our initial review of this decision, we determined that the Board's findings were clearly erroneous and we reversed. *In re Zurko*, 111 F.3d 887, 42 USPQ2d 1476 (Fed. Cir. 1997) (" *Zurko I*"). At the Commissioner's suggestion, we then reheard this case en banc to reconsider the question of the appropriate standard of review. The Commissioner argued that Board findings should be reviewed under the standards

of the Administrative Procedure Act (APA), namely the substantial evidence or arbitrary and capricious standard. 5 U.S.C. § 706 (1994). The en banc court held, however, that clear error was the correct standard of review for Board findings of fact and adopted the conclusions of the original panel decision. *In re Zurko*, 142 F.3d 1447, 46 USPQ2d 1691 (Fed. Cir. 1998) ("*Zurko II*").

The Commissioner then petitioned for review by the Supreme Court, and the Court reversed, holding that Board findings of fact must be reviewed under the APA standards of review. The Court did not specify which APA standard of review to apply, substantial evidence or arbitrary and capricious. We subsequently decided this question in *In re Gartside*, 203 F.3d 1305, 53 USPQ2d 1769 (Fed. Cir. 2000), and held that substantial evidence is the correct APA standard of review for Board factual findings.

We now revisit the merits of our decision in *Zurko I*, applying the proper APA standard of review. In doing so, we conclude that the outcome of this case does not change with the application of this new standard of review. Because the factual findings underlying the Board's decision are not supported by substantial evidence, we reverse.

BACKGROUND

The '666 application concerns a method for more efficiently creating a secure computer environment. Secure, or "trusted," computer environments employ trusted software designed to preclude unauthorized users and to prevent unintended or unauthorized commands. Such trusted software is often quite costly, compared to untrusted software, so it is desirable to minimize the amount of trusted software in the system. Applicants claim a method for processing trusted commands with a minimum of trusted software.

Representative claim one reads as follows:

1. A machine-executed method for executing a trusted command issued by a user on a computer system, the computer system including an untrusted computing environment and a trusted computing environment, said method comprising the steps of:

*1695 (a) parsing the trusted command in the untrusted computing environment to generate a parsed command;

(b) submitting the parsed command to the trusted

computing environment;

(c) displaying a representation of the trusted command to the user through a trusted path;

(d) receiving a signal from the user through a trusted path signifying whether the displayed representation accurately represents the user's intentions;

(e) if the signal signifies that the displayed representation does not accurately represent the user's intentions, then preventing the execution of the parsed command;

(f) if the signal signifies that the displayed representation accurately represents the users intentions, executing the parsed command in the trusted environment.

As set forth in claim one, applicants' method involves processing and verifying a trusted command using both trusted and untrusted software. A trusted command is first processed by untrusted software to create a parsed command. The parsed command is then submitted to the trusted computer environment. Execution of this command requires verification along a trusted path. The parsed command is relayed to the user along a trusted path, and, if correct, the user can send a confirming signal back along this trusted path, allowing execution of the command. By processing a trusted command in this manner, the applicants contend they reduce the amount of trusted software. The applicants assert that the parsing step generally requires a large amount of software and that performing this step with untrusted software greatly reduces the amount of trusted code required to process a trusted command.

The Board sustained the Examiner's rejection of claims 1, 4, and 5 of the '666 application under 35 U.S.C. § 103 based on two prior art references. The primary reference is the UNIX operating system, as described in the applicants' information disclosure statement ("IDS"). According to this description, the UNIX system employs both untrusted and trusted code. Furthermore, certain commands in a UNIX system may be parsed in an untrusted environment, and then these parsed commands may be executed by "calling a trusted service that executes in a trusted computing environment."

The secondary reference, also described in applicants' IDS, is Dunford, FILER Version 2.20 ("FILER2"). This program repeats back potentially dangerous

commands, requesting confirmation from the user before execution.

Considering the teachings of these two references, the Board concluded that the invention claimed by the '666 application would have been obvious. The Board commented that "the artisan would have been led from these teachings to take the trusted command parsed in an untrusted environment and submitted to the trusted computing environment, as taught by UNIX, and to display the parsed command to the user for confirmation prior to execution, as suggested by [FILER2]." *Ex parte Zurko*, slip op. at 6-7. According to the Board, this combination would render the claimed invention obvious.

The Board also responded to applicants' arguments that neither reference discloses a trusted path communication to the user and that no teaching of the prior art references motivates the combination of these references to create the claimed invention. The Board said that communication along a trusted path, if not explicit in the prior art, is either inherent or implicit. *Id.* at 7. The Board further adopted the Examiner's assertion that "it is basic knowledge that communication in trusted environments is performed over trusted paths." *Id.* at 8. As for the motivation to combine these references, the Board concluded that it "would have been nothing more than good common sense" to combine the teachings of these references. *Id.* The Board noted that FILER2 taught the verification of dangerous commands in general, suggesting verification of the parsed command submitted to the trusted computing environment in UNIX. Because this verification occurs within a trusted environment, it is "basic knowledge," according to the Board, that this verification would occur along a trusted path. *Id.* at 7-8.

Reviewing the Board's decision in *Zurko I*, we held that "the Board's finding that the prior art teaches, either explicitly or inherently, the step of obtaining confirmation over a trusted pathway [was] clearly erroneous." *Zurko I*, 111 F.3d at 889, 42 USPQ2d at 1478. Indeed, we noted that neither reference relied upon by the Board taught communication with *1696 the user over a trusted pathway. *Id.*, 42 USPQ2d at 1479. We further held that the Board clearly erred in finding that the prior art teaches communicating with the user over both a trusted and an untrusted path. This finding was in conflict with the Board's other finding that trusted communications must be over trusted paths. *Id.* at 890, 42 USPQ2d at 1479.

On remand, applicants urge that we maintain our reversal of the Board's decision, arguing that the decision is legally flawed, or, alternatively, that the Board's factual findings fail under the APA standard of review. The Commissioner responds that we must affirm the Board decision because its findings are supported by substantial evidence in the record.

DISCUSSION

A claimed invention is unpatentable for obviousness if the differences between it and the prior art "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103(a) (1994); *Graham v. John Deere Co.*, 383 U.S. 1, 14, 148 USPQ 459, 465 (1966). Obviousness is a legal question based on underlying factual determinations including: (1) the scope and content of the prior art, including what that prior art teaches explicitly and inherently; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. *Graham*, 383 U.S. at 17-18, 148 USPQ at 467; *In re Dembiczak*, 175 F.3d 994, 998, 50 USPQ 1614, 1616 (Fed. Cir. 1999); *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995) (stating that the inherent teachings of a prior art reference is a question of fact). We review the ultimate legal determination of obviousness without deference. *In re Dembiczak*, 175 F.3d at 998, 50 USPQ at 1616. We review factual findings underlying this determination for substantial evidence. *In re Gartside*, 203 F.3d at 1311-16, 53 USPQ2d at 1772-75.

Substantial evidence is "such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938); *see also Zurko III*, 527 U.S. at 162, 50 USPQ2d at 1772-75. A review under this standard "involves an examination of the record as a whole, taking into consideration evidence that both justifies and detracts from the agency's decision." *In re Gartside*, 203 F.3d at 1312, 53 USPQ2d at 1773 (citing *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 487-88 (1951)). In addition, "the possibility of drawing two inconsistent conclusions from the evidence does not prevent an administrative agency's finding from being supported by substantial evidence." *Consolo v. Fed. Maritime Comm'n*, 383 U.S. 607, 619-20 (1966).

The substantial evidence standard has been analogized to the review of jury findings, and it is

generally considered to be more deferential than the clearly erroneous standard of review. *Zurko III*, 527 U.S. at 162-63, 50 USPQ2d at 1936. The Supreme Court noted in *Zurko III*, however, that this generally recognized difference is "a subtle one," so fine that in its review of case law in the *Zurko III* decision, the Court could not find any other case where a reviewing court had conceded that the standard of review made a difference. *Id.* Moreover, while appellate courts must respect agency expertise, the Court has "stressed the importance of not simply rubber-stamping agency fact finding." *Id.* (citing *Universal Camera*, 340 U.S. at 477-78). Indeed, the Court observed that Federal Circuit judges "will examine [Board fact] findings through the lens of patent-related experience -- and properly so, for the Federal Circuit is a specialized Court." *Id.* The Court further noted that this "comparative expertise, by enabling the Circuit better to understand the basis for the [Board's] finding of fact, may play a more important role in assuring proper review than would a theoretically somewhat stricter standard." *Id.*

With this guidance from the Supreme Court in mind, we now reconsider the Board's decision. Applicants urge that we reaffirm our conclusion in *Zurko I*, alleging numerous legal and factual errors in the Board decision. These arguments center around two issues. First, applicants argue that the prior art relied upon by the Board does not disclose one of the limitations of their claimed invention, namely communication between a trusted environment and the user along a trusted path. Second, applicants claim that there is no substantial evidence support for the Board's finding of motivation to combine the cited references to yield the claimed invention. We only need to consider the first issue raised by applicants.

As to this first issue, the Commissioner apparently concedes that neither the UNIX IDS disclosure nor FILER2 teaches communications between the user and the trusted environment along a trusted path. Nevertheless, the Commissioner maintains that the Board's findings concerning the content of the prior art are supported by four other references in the record. [FN1][1] As to this first issue, the Commissioner apparently concedes that neither the UNIX IDS disclosure nor FILER2 teaches communications between the user and the trusted environment along a trusted path. Nevertheless, the Commissioner maintains that the Board's findings concerning the content of the prior art are supported by four other references in the record. [FN1] The Commissioner argues that these additional references

describe modified UNIX systems that allow communication over both trusted and untrusted paths. Therefore, the Commissioner argues, the Board's general findings concerning the content of the prior art have substantial evidence support, as does its ultimate conclusion of obviousness.

We are unpersuaded by the Commissioner's arguments. The Board's conclusion of obviousness was based on the UNIX and FILER2 references. The Board's findings with respect to these references simply cannot be supported by the alternative references identified by the Commissioner on remand. To the contrary, these alternative references merely confirm the well-known fact that conventional UNIX systems do not allow communication between the user and the trusted environment along a trusted path. For example, *Johrie et al.*, U.S. Pat. No. 4,918,653, comments that "[s]ome examples of prior art multi-user operating systems which have not provided an effective mechanism for establishing a trusted path include UNIX . . ." *Johrie*, col. 1, II. 60-63.

The Commissioner also cannot now mend the Board's faulty conclusion of obviousness by substituting these alternative references for those relied upon by the Board. This new combination of references would constitute a new ground for rejection, not considered or relied upon by the Examiner or the Board. It is well settled that it would be inappropriate for us to consider such a new ground of rejection. *In re Margolis*, 785 F.2d 1029, 1032; 228 USPQ 940, 942 (Fed. Cir. 1986); see also *Koyo Seiko Co., Ltd. v. United States*, 95 F.3d 1094, 1099 (Fed. Cir. 1996) (holding that "[t]he grounds upon which an administrative order must be judged are those upon which the record discloses that its action was based.") (quoting *SEC v. Chenery Corp.*, 318 U.S. 80, 87 (1943)).

Finally, the deficiencies of the cited references cannot be remedied by the Board's general conclusions about what is "basic knowledge" or "common sense" to one of ordinary skill in the art. As described above, the Board contended that even if the cited UNIX and FILER2 references did not disclose a trusted path, "it is basic knowledge that communication in trusted environments is performed over trusted paths" and, moreover, verifying the trusted command in UNIX over a trusted path is "nothing more than good common sense." *Ex parte Zurko*, slip op. at 8. We cannot accept these findings by the Board. This assessment of basic knowledge and common sense was not based on any evidence in the record and, therefore, lacks substantial evidence support. As an

administrative tribunal, the Board clearly has expertise in the subject matter over which it exercises jurisdiction. This expertise may provide sufficient support for conclusions as to peripheral issues. With respect to core factual findings in a determination of patentability, however, the Board cannot simply reach conclusions based on its own understanding or experience -- or on its assessment of what would be basic knowledge or common sense. Rather, the Board must point to some concrete evidence in the record in support of these findings. [FN2] To hold otherwise would render the process of appellate review for substantial evidence on the record a meaningless exercise. *Baltimore & Ohio R.R. Co. v. Aderdeen & Rockfish R.R. Co.*, 393 U.S. 87, 91-92 (1968) (rejecting a determination of the Interstate Commerce Commission with no support in the record, noting that if the Court were to conclude otherwise "[t]he requirement for administrative decisions based on substantial evidence and reasoned findings -- which alone make effective judicial review *1698 possible -- would become lost in the haze of so-called expertise"). Accordingly, we cannot accept the Board's unsupported assessment of the prior art.

CONCLUSION

The Board's conclusion of obviousness was based on a misreading of the references relied upon and, therefore, lacks substantial evidence support. Accordingly, the Board's judgment is reversed.

REVERSED.

FN1. Specifically, the Commissioner points to Johrie et al., U.S. Pat. No. 4,918,653; E.J. McCauley et al., *KSOS: The Design of a Secure Operating System*, Ford Aerospace and Communications Corp. (1979); Stanley R. Ames, Jr. et al., *Security Kernel Design and Implementation: An Introduction*, IEEE Cat. No. 830700-001 (July 1983); and Simon Wiseman et al., *The Trusted Path Between Smite and the User*, Proceedings 1988 IEEE Symposium on Security and Privacy (April 18-21, 1988).

FN2. As described above, we cannot accept the Commissioner's invitation to now search the record for references in support of the Board's general conclusions concerning the prior art. Even if any such references could support these conclusions, it would be inappropriate for us to consider references not relied upon by the Board. *In re Margolis*, 785 F.2d at 1032; 228 USPQ at 942.

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Briefs and Other Related Documents (Back to top)

. 2000 WL 33978332 (Appellate Brief) Reply Brief for Appellants (Feb. 01, 2000)

. 2000 WL 33978025 (Appellate Brief) Brief for Appellee commissioner of Patents and Trademarks On Remand From the United States Supreme Court (Jan. 04, 2000)

. 1999 WL 33612483 (Appellate Brief) Brief of Amicus Curiae Federal Circuit Bar Association in Support of Appellants Mary E. Zurko et al. (Nov. 01, 1999)

. 1999 WL 33612480 (Appellate Brief) Upon Remand from the Supreme Court Brief for Amicus Curiae New York Intellectual Property Law Association in Support of Reviewing Patent and Trademark Office Fact-Finding Under the Substantial Evidence Standard of Review (Oct. 20, 1999)

. 1997 WL 33484996 (Appellate Brief) Reply Brief for Appellee Commissioner of Patents and Trademarks (Nov. 26, 1997)

. 1997 WL 33484901 (Appellate Brief) Brief for Amicus Curiae Federal Circuit Bar Association in Support of Appellants Zurko et al. (Nov. 19, 1997)

. 1997 WL 33484902 (Appellate Brief) Brief of Amicus Curiae Houston Intellectual Property Law Association in Support of Appellants Mary E. Zurko, et al. (Nov. 03, 1997)

. 1997 WL 33484903 (Appellate Brief) Brief of the Dallas-Fort Worth Intellectual Property Law Association as Amicus Curiae Urging Reversal (Nov. 03, 1997)

. 1997 WL 33487147 (Appellate Brief) Brief of the Dallas-Fort Worth Intellectual Property Law Association as Amicus Curiae Urging Reversal (Nov. 03, 1997)

. 1997 WL 33487160 (Appellate Brief) Brief for Amicus Curiae (Nov. 03, 1997)

. 1997 WL 33487161 (Appellate Brief) Brief of Amicus Curiae (Nov. 03, 1997)

. 1997 WL 33493020 (Appellate Brief) Brief for

Amicus Curiae New York Intellectual Property Law Association in Support of Reviewing Patent and Trademark Office Fact-Finding Under the Clearly Erroneous Standard of Review (Oct. 30, 1997)

. 1997 WL 33488027 (Appellate Brief) Corrected Brief for Amicus Curiae Biotechnology Industry Organization, in Support of Mary P. Zurko, et al. (Oct. 28, 1997)

. 1997 WL 33488026 (Appellate Brief) Brief for Amicus Curiae, Pharmaceutical Research and Manufacturers of America, in Opposition to Overruling the Present Standard of Review of Patent and Trademark Office Decisions (Oct. 24, 1997)

. 1997 WL 33487060 (Appellate Brief) Supplemental Brief for Appellee Commissioner of Patents and Trademarks (Sep. 02, 1997)

. 1997 WL 33487148 (Appellate Brief) Corrected Brief for Amicus Curiae Seagate Technology, Inc., in Support of Respondent Commissioner of Patents and Trademarks (Aug. 29, 1997)

. 1997 WL 33488025 (Appellate Brief) Brief for Amicus Curiae, Thomas G. Field, Jr. Supporting, in Principle, on Rehearing the Commissioner of Patents and Trademarks (Aug. 13, 1997)

. 1996 WL 33414564 (Appellate Brief) Brief and Supplemental Appendix for Appellee Commissioner of Patents and Trademarks (Jul. 01, 1996)

. 1996 WL 33414664 (Appellate Brief) Brief for Appellants (May. 17, 1996)

END OF DOCUMENT

Appendix 4:

Tandon Corp. v. United States Intern. Trade Comm'n, 831 F.2d 1017, 4 U.S.P.Q.2d 1283, 1288

(Fed. Cir. 1987).

▽

Briefs and Other Related Documents

Tandon Corp.
v.
U.S. International Trade Commission

Court of Appeals, Federal Circuit

No. 86-1077

Decided September 30, 1987

United States Patents Quarterly Headnotes

PATENTS

[1] Patent construction -- Claims -- Defining terms (§ 125.1305)

International Trade Commission correctly interpreted patent claims for double-sided computer disk drive to mean that lower transducer is fixed to prevent movement in any direction, in view of substantial evidence in record, including remarks of patent applicant accompanying amendment, demonstrating that lower transducer is intended to have invariant position, since use of term "non-gimbaled" in one claim does not require that other claims be read to encompass gimbaled or moveable lower transducer pursuant to "doctrine of claim differentiation."

PATENTS

[2] Infringement -- Literal infringement (§ 120.05)

International Trade Commission did not err in holding that accused device did not literally infringe claims of patented disk drive, since commission correctly interpreted claims to require lower transducer to be fixed to prevent movement in any direction, and since record contains substantial evidence showing that lower transducer of accused device is supported by suspension means permitting vertical and horizontal movement greater than that of patent's lower transducer under similar conditions.

PATENTS

[3] Infringement -- Doctrine of equivalents -- In general (§ 120.0701)

Infringement -- Defenses -- Prosecution history estoppel (§ 120.1105)

International Trade Commission did not err in holding that accused device did not infringe patented disk drive by doctrine of equivalents, since substantial evidence in record demonstrates that patented device, which suppresses both large and small fluctuations of

disk, transfers data differently from accused device, which suppresses large-scale fluctuations while permitting transducers to "follow" smaller fluctuations, and since patentee amended application to clearly differentiate it from devices which allow transducers to move along with small-scale disc fluctuations and is therefore estopped from asserting that such devices infringe by doctrine of equivalents.

PATENTS

Particular Patents -- Recording Devices

4,151,573, Tandon, Hackney and Applequist, Magnetic Recording Device for Double Sided Media, holding of non-infringement of claims 1, 5, and 12 affirmed.

*1284 Appeal from final decision of U.S. International Trade Commission; 229 USPQ 968.

Action by Tandon Corporation before International Trade Commission for unfair practices based on importation of double-sided floppy disk drives in infringement of patent by Mitsubishi Electric Corporation, Mitsubishi Electronics America Inc., TEAC Corporation, TEAC Corporation of America, Sony Corporation, and Sony Corporation of America. From commission decision holding patent not infringed, Tandon Corporation appeals. Affirmed.

Steven E. Lipman, Washington, D.C. (Lupo, Lipman & Lever, R. V. Lupo, Jack Q. Lever, Jr., and Sandra A. Sellers, Washington, D.C., Raymond A. Bogucki, Louis A. Mok, Fraser & Bogucki, and James A. Hamilton, Thomas K. Bourke, Riordan & McKinzie, and Norman H. Kirshman, Michael Harris, and Kirshman & Harris, Los Angeles, Calif., with him on brief), for appellant Tandon Corp.

Marcia H. Sundeen, Washington, D.C. (Lyn M. Schlitt, general counsel, and Michael P. Mabile, assistant general counsel, with him on brief), for appellee ITC.

Robert M. Taylor, Jr. Costa Mesa, Calif. (Lyon & Lyon, Samuel B. Stone, Gary M. Anderson, and David B. Murphy, Costa Mesa, Calif., and Thomas P. Ondeck, Kevin M. O'Brien, and Baker & McKenzie, Washington, D.C., with him on brief), for internors-appellees Mitsubishi Electric Corp., and Mitsubishi Electronics America Inc.

Before Friedman, Newman, and Archer, Circuit

Judges.

Newman, Circuit Judge.

Tandon Corporation appeals the final decision of the United States International Trade Commission which held that Tandon's U.S. Patent No. 4,151,573 ("the '573 patent") was not infringed by certain imported double-sided floppy disk drives and therefore that there was no violation of section 337 of the Tariff Act of 1930 as amended, 19 U.S.C. §1337. *In re Certain Double-Sided Floppy Disk Drives and Components Thereof*, 229 USPQ 968 (USITC 1986). We affirm, on the basis that substantial evidence supports the Commission's finding of noninfringement.

Standard of Review

In this case that turns on the factual question of infringement, which in turn requires decision of factual questions of technological equivalency as well as the factual underpinnings of claim interpretation, we once more remark on the standard of appellate review that is set by the governing statutes. 19 U.S.C. §1337(c) provides for appellate review "in accordance with chapter 7 of title 5". 5 U.S.C. §706, subparagraph (2)(E), imposes the "substantial evidence" standard of review on Commission findings and conclusions. There is a significant difference between the standards of "substantial evidence" *1285 and of "clearly erroneous", and in close cases this difference can be controlling. See, for example, R.L. Stern, *Review of Findings of Administrators, Judges and Juries: A Comparative Analysis*, 58 Harv. L. Rev. 70, 80-89 (1944), in which was stated, "Policy, authority and history all thus show that the 'clearly erroneous' rule gives the reviewing court broader powers than the 'substantial evidence' formula," at pages 88-89. See also *Consolo v. Federal Maritime Commission*, 383 U.S. 607, 619-20 (1966).

It was the intent of Congress that greater weight and finality be accorded to the Commission's findings as compared with those of a trial court. See S. Rep. No. 466, 96th Cong., 1st Sess. 26 (1979). Indeed, the Senate Report criticized the Court of Customs and Patent Appeals' use of a more rigorous standard of review on the question of obviousness (i.e., was the decision "clearly contrary to the weight of the evidence") in *Solder Removal Company v. U.S. International Trade Commission*, 582 F.2d 628, 199 USPQ 129 (CCPA 1978). *Id.*

At the same time, the Senate Report accompanying

the Trade Act of 1974 made clear that the Commission's primary responsibility is to administer the trade laws, not the patent laws:

[I]n patent-based cases, the Commission considers, for its own purposes under section 337, the status of imports with respect to the claims of U.S. patents. The Commission's findings neither purport to be, nor can they be, regarded as binding interpretations of the U.S. patent laws in particular factual contexts. Therefore, it seems clear that any disposition of a Commission action by a Federal Court should not have a res judicata or collateral estoppel effect in cases before such courts.

S. Rep. No. 1298, 93d Cong., 2d Sess. 196, reprinted in 1974 U.S. Code Cong. & Admin. News 7186, 7329. Thus, our appellate treatment of decisions of the Commission does not estop fresh consideration by other tribunals. See *Lannom Manufacturing Co., Inc. v. U.S. International Trade Commission*, 799 F.2d 1572, 1577-78, 231 USPQ 32, 36 (Fed. Cir. 1986).

Background

Tandon alleged unfair practices based on importation by the respondents of certain double-sided floppy disk drives in infringement of certain claims of the '573 patent; the sale of the accused devices was asserted to have the effect or tendency to destroy or substantially injure an efficiently and economically operated industry in the United States. 50 Fed. Reg. 4276 (1985). The respondents were Mitsubishi Electric Corporation, Mitsubishi Electronics America, Inc., TEAC Corporation, TEAC Corporation of America, Sony Corporation, and Sony Corporation of America. Following a twelve-day hearing the Commission issued a temporary exclusion order. *In re Certain Double-Sided Floppy Disk Drives and Components Thereof*, 227 USPQ 982, 991 (USITC 1985). Before trial on the question of permanent relief Tandon settled with and granted licenses to all respondents except the two Mitsubishi companies (hereinafter "Mitsubishi").

The '573 patent is entitled "Magnetic Recording Device for Double Sided Media", and lists inventors Sirjang L. Tandon, Alfred C. Hackney, and Roy A. Applequist. The claimed invention is an apparatus whereby a pair of magnetic heads, also called transducers, receive and transfer information from and to both sides of a floppy disk. [FN1] A drive mechanism moves the transducers along the disk radius to access its concentric data tracks as the disk rotates. The Tandon device was illustrated in the '573 patent

as:

Image 1 (1.25 X 4.25) Available for Offline Print

Tandon's first or lower transducer is shown at (14) as a "button head" transducer. As described in the specification, this transducer is fixed to the carriage, and the upper transducer is gimballed.

Early floppy disks stored information on only one side, using a single rigidly mounted transducer for data transfer. Opposite the single transducer was a pad that pressed the disk against the transducer and absorbed *1286 disk irregularities. The first double-sided floppy disk drive was introduced in 1976 by the International Business Machines Corporation. The IBM disk drive had two symmetric cantilevered transducers, one for each side of the disk, both supported on spring suspensions referred to as gimbal [FN2] springs. The gimbal springs enabled the heads to rotate around the X, and Y axes, and move in the normal direction along the Z axis [FN3]. The heads thus followed the irregularities of the disk.

The Tandon disk drive of the '573 patent was stated to solve certain technological problems that inhered in the IBM drive, particularly misalignment between the heads and disk tracks due to the weak suspension that was designed to compensate for waviness of the disk in the Z direction. Tandon describes its invention as the first successful solution to use of double-sided floppy disk drives, a major factor in the computer revolution, and widely licensed. The Tandon drive uses, as described in the specification, a fixed transducer on one side of the disk and a movable transducer mounted on a gimbal spring on the other side. The movable transducer forces the magnetic disk against the fixed transducer, thus reducing the Z-direction movement of the disk and improving the accuracy of reading/writing to the disk.

The accused Mitsubishi devices are double-sided disk drives which contain two gimballed transducers that, according to the findings of the Administrative Law Judge ("ALJ"), are more stiffly mounted than the IBM transducers, but neither of which is as rigidly fixed as the lower transducer of Tandon. Mitsubishi's lower transducer has a load point which, according to the findings of the ALJ, somewhat limits its movement in the Z-direction. Tandon asserts that the stiffness of the gimballed transducers and the limitation on Z-axis movement brings the Mitsubishi device within the scope of the '573 claims.

Following the trial on permanent relief, in which Tandon, Mitsubishi, and the Commission's investigative staff participated, the ALJ found that the Mitsubishi disk drives did not infringe claims 1, 5, and/or 12 of the '573 patent, which were all of the independent claims at issue, and that injury had not been proven. The Commission affirmed the ALJ's determination of non-infringement, and expressly took no position on the question of injury.

Claim Interpretation

The principal issue in the Commission's infringement analysis was the degree of "fixedness" of the Mitsubishi lower transducer. Tandon argues that the claims are infringed because the Mitsubishi lower head is "fixed" in the Z or normal direction, which Tandon asserts is the only fixedness that the claims require, and that measurements show that the Mitsubishi lower head is as "fixed" as the Tandon lower head.

The Commission thus undertook to interpret the term "fixed" as used in the claims. The Commission concluded that the claims mean that the lower head is fixed not only in the Z direction, but also in the X and Y directions. Tandon ascribes error to this claim interpretation.

Claim interpretation is a question of law, having factual underpinnings. When the meaning of key terms of claims is disputed, as in this case, extrinsic evidence may be adduced including testimony of witnesses, and reference may be had to the specification, the prosecution history, prior art, and other claims. *H.H. Robertson Co. v. United Steel Deck, Inc.*, 820 F.2d 384, 389, 2 USPQ2d 1926, 1929 (Fed. Cir. 1987); *SRI International v. Matsushita Electric Corp. of America*, 775 F.2d 1107, 1117 n.11, 1118, 227 USPQ 577, 582 n.11, 583 (Fed. Cir. 1985). Claims may not be construed one way in order to obtain their allowance and in a contrary way against infringers. *Autogiro Company of America v. United States*, 384 F.2d 391, 398-99, 155 USPQ 697, 703-04 (Ct. Cl. 1967). When the interpretation of claims requires findings of underlying fact, those factual findings are reviewed in accordance with the appropriate evidentiary standard, i.e., that of substantial evidence. *Texas Instruments, Inc., v. U.S. International Trade Commission*, 805 F.2d 1558, 1562 n.2, 231 USPQ 833, 834 n.2 (Fed. Cir. 1986).

The Commission's claim interpretation placed great weight on Tandon's prosecution history in the Patent and Trademark Office. Amendments to claims 1, 5 and

12 were *1287 made by Tandon in order to distinguish the claims from a cited reference describing the IBM drive system. The emphasized phrases represent material added by these amendments:

1. A device for maintaining *a pair of* magnetic transducers in operative relation with both sides of a non-rigid planar magnetic recording media comprising:

a first transducer mounted *relative to* a first side of the media and having a fixed position *in a direction normal* to the plane of the media *despite movement to different positions along the plane of the media, the first transducer being disposed in data transfer position relative to the media*;

a support mechanism adjacent to the second side of the media in a region opposite the first transducer;

a second transducer coupled *by gimbal support means* to the support mechanism in opposition to the first transducer *and movable toward and away from the plane of the media*; and

means coupled to said support mechanism for urging said second transducer toward said first transducer *and said media* to maintain both transducers in operative relation with the intervening media *with the first transducer serving as a fixed positional reference despite tendencies of the media to deviate in position from its nominal plane and the second transducer matingly accommodating said tendencies by virtue of its gimbal support*.

5. A device for maintaining *a pair of* magnetic transducers in operative relation with *opposite* sides of a non-rigid magnetic recording media comprising:

a first *non-gimballed* transducer mounted on a first side of the media and having a *relatively* fixed position relative to the plane of the media *in which the first transducer is in operative relationship with the first side of the media*;

a pivotable support arm having a pivot axis in fixed spatial relationship to the first transducer, and extending along the second side of the media to a region opposite the first transducer;

a second transducer coupled *by gimbal means* to the support arm in opposition to the first transducer

and being movable relative to the plane of the media and to the first transducer; and

means coupled to said support arm for urging said second transducer *and the media* toward said first transducer with a force such that close operative relationship is maintained between each transducer and the associated side of the intervening media, *with tendencies of the media to deviate from its nominal plane being compensated by the second transducer*.

12. In a magnetic recording system in which a carriage supporting two magnetic heads is shifted radially relative to a center-driven pliant magnetic disc to provide data transfer with selectable record tracks on either side of the disc, the improvement comprising:

a first transducer fixedly coupled to the carriage for bearing against a first side of the disc in *an invariant position in a direction normal to the plane of the disc*;

and means including a second *gimbal mounted* transducer movably coupled to the carriage for bearing against the second side of the disc in opposed relation to the first transducer, *the second transducer being movable toward and away from the plane of the disc and the first transducer*, said means including resilient means urging said second transducer toward said first transducer with sufficient force to maintain close operative relationship between both said transducers and the disc despite deviation of portions of the disc *during movement thereof, with the second gimbal mounted transducer compensating tendencies of the pliant disc to deflect*.

Relying on this prosecution history, and on testimony emphasizing the requirement of the claims that the first transducer is in a fixed position, thus serving as a positional reference to the media and the second, gimballed transducer, the Commission interpreted the word "fixed" to mean that the first transducer does not move in any direction. The Commission referred to the patent specification which "repeatedly emphasizes and explains that in the claimed invention the disk is deflected by the *fixed* transducer and at the same time confined against the *fixed* transducer" (emphasis in original), and to the testimony of Mitsubishi's patent expert Jessup and technical expert Lewis that the term "fixed" has the generally accepted meaning in the disk drive industry as "designed to be not able to move."

Tandon urges that the clauses "fixed position in a direction normal to the plane of the media" in claim 1, and "fixedly coupled . . . in an invariant position in a direction normal to the plane of the disc" in claim 12, only limit movement in the Z direction but do not restrict movement about the X and Y axes. Tandon points out that it was excess movement along the Z axis that flawed the prior art IBM heads, and argues that the Tandon claims should not be interpreted as requiring a degree of fixedness beyond that needed to distinguish from this prior art. Indeed, Tandon says, the critical text of the claims stating *1288 that the lower transducer is fixed in a direction normal to the plane of the media was required by the examiner as a condition of allowance to distinguish the claims over the IBM reference.

However, in distinguishing the IBM reference to the patent examiner, Tandon wrote in its remarks accompanying the amendment that the IBM drive

employs two pivotable, gimbaled heads, which . . . during operation, . . . move with at least two degrees of freedom to attempt to follow the deviations of the floppy disk from its nominal position. In contrast, applicants' system utilizes *one head that has an invariant position* bearing against one side of the media *without spring loading*, and *this head is nongimbaled*. [emphases added]

Although Tandon states that this argument did not apply to claims 1 and 12, the Commission did not accept that view. The Commission's position is sufficiently supported in the record, for there is nothing in the prosecution history that limits the quoted comments to any particular claim or claims. Further, Tandon's specification and prosecution history do not teach any difference in the degree of fixedness of the first transducer among described or claimed embodiments of the invention.

The phrase "normal to the plane" does not appear in the specification as filed. Tandon argues that the amendment adding this phrase shows the intended absence of restraint of movement in the X and Y directions. However, Tandon represented, as it must, that the amendment was "without the addition of new matter." The added phrase can not enlarge the scope of the claims beyond that supported in the specification, and can not change the disclosure in a way contrary to its substance as filed.

37 C.F.R. 1.118(a): . . . All amendments to the specification, including the claims, and the

drawings filed after the filing date of the application must conform to at least one of them as it was at the time of the filing of the application.

The addition of the amendment describing movement in the Z direction did not thereby expand the disclosure and claims with respect to movement in the X and Y directions.

Tandon argues that since claim 5 expressly describes the first transducer as non-gimbaled, claims 1 and 12 must be read as encompassing a gimbaled first transducer. Tandon argues that the "doctrine of claim differentiation" prevents reading into claims 1 and 12 this limitation of claim 5, citing *D.M.I., Inc. v. Deere & Co.*, 755 F.2d 1570, 1574, 225 USPQ 236, 239 (Fed. Cir. 1985).

The Commission held that claim 5 does "not differ in scope with respect to the movement of the lower transducer" from that of claims 1 and 12, and that the term "relatively fixed" in claim 5 "does not have a different meaning from the terms 'fixed' and 'fixedly coupled' as used in claims 1 and 12." The Commission held that this claim interpretation did not violate the doctrine of claim differentiation, since it related to only one element of claim 5, and that claim 5 viewed as a whole could still differ in scope from claims 1 and 12.

There is presumed to be a difference in meaning and scope when different words or phrases are used in separate claims. To the extent that the absence of such difference in meaning and scope would make a claim superfluous, the doctrine of claim differentiation states the presumption that the difference between claims is significant. *D.M.I.*, 755 F.2d at 1574, 225 USPQ at 239; *Autogiro*, 384 F.2d at 404, 155 USPQ at 708. At the same time, practice has long recognized that "claims may be multiplied . . . to define the metes and bounds of the invention in a variety of different ways." *Bourns, Inc. v. United States*, 537 F.2d 486, 492 (Ct. Cl. 1976), 187 USPQ 174, 178 (Ct. Cl. 1975), *aff'd. per curiam*, 199 USPQ 256 (Ct. Cl. 1976). Thus two claims which read differently can cover the same subject matter. Further, as this court stated in *D.M.I.*, 755 F.2d at 1574 n.2, 225 USPQ at 238 n.2, "[c]laims are always interpretable in light of the specification that led to the patent." *See also Autogiro*, 384 F.2d at 397, 155 USPQ at 702 ("No matter how clear a claim appears to be, lurking in the background are documents that may completely disrupt initial views on its meaning"). Whereas under the facts of *D.M.I.* there was "simply no basis in either the specification or prosecution history" for limiting the claim beyond its

literal terms, 755 F.2d at 1574 n.2, 225 USPQ at 238 n.2, in Tandon's case the Commission held that the specification and the prosecution history require that the claims be limited to a non-gimballed, fixed, lower transducer. Whether or not claims differ from each other, one can not interpret a claim to be broader than what is contained in the specification and claims as filed. *See Autogiro*, 384 F.2d at 397, 155 USPQ at 702-03 ("[W]ords must be used in the same way in both the claims and the specification."); 37 C.F.R. 1.75(d)(1):

[T]he terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description.

***1289** Thus, as a matter of claim interpretation, the Commission correctly held that the inclusion of the term "non-gimballed" in claim 5 did not require that claims 1 and 12 be read to encompass a gimballed first transducer.

[1] We have considered all of the arguments offered by Tandon, and conclude that on this record the Commission correctly interpreted claims 1, 5 and 12 to mean that the first transducer is fixed in all directions.

Infringement

Applying the claims as it interpreted them, the Commission found that the Mitsubishi drives do not infringe claims 1, 5 and 12 of the '573 patent, either literally or under the doctrine of equivalents. We review these findings to determine whether they are supported by substantial evidence.

A.

Mitsubishi Tandon (5 1/4'') Tandon (8'') IBM

Z (normal) 29 17 59 3,139

and that the lower heads also moved comparable amounts in the X (pitch) and Y (roll) directions (in arc minutes):

Mitsubishi Tandon (5 1/4'') Tandon (8'') IBM

X (pitch) 3.8 0.30 0.45 22.62

Y (roll) 0.60 0.30 0.45 18.17

Mitsubishi's accused devices included several models, of which one embodiment was illustrated as:

Image 2 (1.75 X 3.75) Available for Offline Print

In the Mitsubishi devices the lower transducer (3) is supported by a gimbal- spring (4) having a load finger (2). A pad (5) is affixed between the gimbal- spring and the load finger. As the ALJ found, the gimbaling of the lower transducer enables roll and pitch movement, while the load finger restricts its movement in the Z-axis direction. The gimbal movement of the upper transducer is not at issue.

Neither Mitsubishi nor the Commission disputes that the patent claims read on the Mitsubishi devices except as to the lower transducer.

Tandon argues that the Mitsubishi devices literally infringe claim 1 since the lower heads of the devices, according to Tandon's measurements, do not move significantly in the Z direction, as discussed below. However, the claim interpretation that the Commission adopted and that we have upheld requires the lower head to be fixed in all directions; further, the ALJ and the Commission found that the lower head of the Mitsubishi device moves significantly in the Z-direction. Substantial evidence supports the Commission's finding that literal infringement has not been proven.

Although the Mitsubishi lower head is supported on gimbal springs and a load point, Tandon argues that the Mitsubishi heads [FN4] in actual use move no more in the X, Y, and Z directions than do the Tandon heads made in accordance with the claimed invention, and thus that claims 1 and 12 are literally infringed. Tandon submitted measurements showing that the Mitsubishi lower heads moved comparably to the Tandon heads in the Z or normal direction (in microinches):

Tandon argues that its data show that the Tandon and Mitsubishi drives all display relatively small movements in the three directions, and that the gimbal spring of the Mitsubishi lower head is purely "cosmetic". Tandon argues that its calculations are based on Mitsubishi's own data, that Z-axis movement in the Mitsubishi device is negligible due to the presence of the "load finger" ϕ MU.S.P.Q.2d 1290 ϕ Mmaking the lower head effectively "fixed", and that X and Y-axis movement of the Mitsubishi device is comparable to that of the Tandon device. Tandon provided the IBM data to show the comparatively large movements in all three directions for drives that are "truly gimballed".

Mitsubishi submitted conflicting data (in micrometers and degrees):

Drive	Z (normal)	X (pitch)	Y (roll)
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Tandon	0.26	0.0017	0.00067
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Mitsubishi

M4841-00M	16.6,	24.1	0.19,	0.65	0.13,	0.42
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-112M	19.8,	19.3	0.083,	0.145	0.16,	0.27
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-001M	42.5,	36.9	0.19,	0.12	0.058,	0.024.
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Tandon's and Mitsubishi's separate measurements of the movement of the different heads produced data that appear to be in bold conflict. For instance, Mitsubishi's measurement of 16.6 micrometers for Z-axis movement on one accused device converts, according to Finding of Fact 216, to 664 [sic: 654] microinches, compared to Tandon's data showing 29 microinches for the same model. Although "facts" in judicial proceedings can be found many ways without offending the natural law, it is of small aid when two sets of scientific "facts", ostensibly measuring the same physical phenomena, show dramatically different results.

The Commission, remarking on the conflicting data, stated that it "afforded greater weight" to the Mitsubishi tests because "those tests considered the loading forces" exerted by the upper arm through the upper transducer against the disk and the lower transducer. The ALJ found that Tandon's data did not take into account these loading forces, and that failure to take these forces into account would result in flawed data. There was expert testimony to the effect that the Tandon device holds the disk flat against the lower head in the absence of the loading force, but that the Mitsubishi does not. We conclude that there was substantial evidence supporting the Commission's reliance on the Mitsubishi tests over the Tandon tests.

Based on the Mitsubishi data, and on videotapes and expert testimony, the Commission found that "the lower or first transducer of the Mitsubishi drives moves significantly during operation of the drives." The Commission further found that "the first (lower) transducer of the Mitsubishi drive does not act as a fixed positional reference for the disk as expressly required by claim 1. Rather, the first transducer in the

Mitsubishi drives follows the movements of the disk, i.e., the disk is not forced to conform to the first transducer."

[2] We uphold, as supported by substantial evidence, the factual findings of the ALJ and the Commission, who had details of the measurements and how they were obtained, and the examination and cross-examination of witnesses as to the data's genesis and significance. Based on these findings, the Commission's finding that there was no literal infringement is supported by substantial evidence, and is affirmed.

B.

Tandon argues that even if the claims are not literally infringed, they are infringed under the doctrine of equivalents. Tandon asserts that the accused devices, as compared with Tandon's claims, perform "substantially the same function in substantially the same way to obtain the same result." *Graver Tank & Mfg. Co. v. Linde Air Prod. Co.*, 339 U.S. 605, 608, 85

USPQ 328, 330 (1950) (quoting *Sanitary Refrigerator Co. v. Winters*, 280 U.S. 30, 42 (1929)).

Although Mitsubishi argues that Tandon relinquished the possibility of asserting equivalency that would encompass the Mitsubishi devices because of the amendments to the claims and representations made to the PTO during prosecution of the Tandon application, Tandon is not estopped from claiming any equivalents at all. See *Mannesmann Demag Corp. v. Engineered Metal Products Co., Inc.*, 793 F.2d 1279, 1284, 230 USPQ 45, 48 (Fed. Cir. 1986) ("Amendment of claims during patent prosecution does not necessarily bar all benefit of the doctrine of equivalents"). However, claims may not be enlarged by equivalents to encompass the teachings of the prior art. *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 900, 221 USPQ 669, 678 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 857 [225 USPQ 792] (1984). Based on Tandon's statements to distinguish the IBM prior art before the PTO, the Commission held that Tandon could not broaden the scope of its claims to include devices utilizing two non-fixed heads.

The Commission found that while the Mitsubishi devices performed the Tandon function of data transfer, they performed the function in a different way. The claimed invention, as described in the specification and in the prosecution history, transfers data utilizing one fixed head which serves as a positional reference on one side of the disk, and one gimbal head on the other side. The accused devices transfer data utilizing two gimbal transducers. The ALJ found that although the two Mitsubishi heads do not move to the same extent as in the IBM *1291 device, they still "follow the deviations of the floppy disk".

Tandon argues that the Commission found that both the Mitsubishi and Tandon devices suppress the large-scale waviness of the disks, and that this suppression of large-scale waviness by both devices is alone sufficient for finding infringement by equivalents. Tandon's proffered data, which compares the Z-axis movement of both devices with the much larger movement of the IBM device, supports its argument that the IBM head follows the large-scale waviness of the disk, which the other two devices suppress. Tandon thus asserts that the Mitsubishi device is much closer to the Tandon device than to the IBM device, which was the most pertinent prior art, and is within a reasonable interpretation of equivalency.

The ALJ found that the Tandon device suppresses

both the large-scale and small-scale fluctuations, while the Mitsubishi device suppresses the large-scale fluctuations only, while following the small-scale fluctuations of the disk. Thus the ALJ found that the Mitsubishi device transfers data in a different way than either the IBM or the claimed devices. These findings are supported by substantial evidence. They are important factors in the determination of non-equivalence.

The ALJ cited test data to the effect "that the degree of movement in the lower head of the Tandon drive does not vary for [various brands of] media. In contrast, in the Mitsubishi drive, the degree of movement of the lower head varied by over a factor of 3:2 depending upon the type of media used. In the Tandon drive, it is the upper head alone which responds to the thickness variations and fluctuations of the media. In the Mitsubishi drive, both heads cooperate to accommodate the thickness variations and fluctuations of the media."

Both the Mitsubishi and the Tandon devices were found to remain within the "critical spacing" from the media of 0.32 microns (12.6 microinches). This spacing is the maximum distance between the media and the head that will allow accurate data transfer. It was uncontroverted that both devices achieve accurate and reliable data transfer. Even so, the ALJ found that a Mitsubishi Mark I 5 1/4 inch drive head moved 16.6 micrometers (664 microinches) in the normal direction, "about 50 times that of the critical spacing", and "several hundred times more than the lower head movement in the Tandon 5 1/4 inch drive".

This evidence supports the Commission's findings that the Mitsubishi device works in a different way from that described and claimed in the '573 patent, as the Tandon device smooths out both the large-scale and the small-scale waviness in the movement of the disk, while the Mitsubishi device follows the small-scale waviness after smoothing out the large-scale waviness.

These findings are also consistent with the amended claim language. Claim 1 was amended to read, in part, "with the first transducer serving as a fixed positional reference despite tendencies of the media to deviate in position from its nominal plane and the second transducer matingly accommodating said tendencies by virtue of its gimbal support". The Tandon lower transducer is claimed as fixed "despite tendencies of the media to deviate", while the gimbal upper transducer follows the deviations.

Tandon's inventors, when confronted with the IBM prior art, distinguished their invention as one which suppresses both large-scale and small-scale waviness. Having successfully argued this position before the PTO, it is simply too late for Tandon to reclaim the ground which it yielded during prosecution. Since the Mitsubishi head moves along with the small-scale fluctuations of the media while remaining within the critical spacing, it falls at worst into the range that Tandon is estopped to claim. The Commission's factual findings supporting this conclusion are supported by substantial evidence.

Tandon's claimed invention suppresses small scale waviness by penetration of the fixed head into the plane of the media. The '573 specification states that "the fixed transducer is positioned to penetrate slightly into the nominal plane of the record element". The ALJ found, based on the testimony of Tandon's patent expert, that "[a]n important aspect of the '573 patent . . . is that the lower head must be 'fixed' so that the media tends to conform to the head rather than the head following any pitching and rolling of the media. . . ." Mitsubishi witnesses Lewis and Hayashi testified to the same effect.

Tandon asserts that the Mitsubishi lower transducers also provide a positional reference for the media in the same way as the claimed device, and therefore infringe as equivalents by performing the same function in substantially the same way. There was evidence, referred to by the ALJ, that "the penetration of the Tandon drive is about five times that of the Mitsubishi drives", and that "the penetration of the lower head in the Mitsubishi devices is not sufficient to establish a physical reference for the disk". The Commission, applying prosecution history estoppel and referring to testimony, concluded that "the Mitsubishi drives, although per *1292 forming the same function, do not perform it in substantially the same way."

Tandon points out that only claims 2 and 13, not here at issue, expressly require penetration of the transducer into the plane of the disk. Invoking the doctrine of claim differentiation, Tandon argues that claims 1, 5, and 12 are not limited to devices that penetrate the plane of the disk. However, before the Patent Office the applicants stated that penetration of the plane is what provides a "reference position" for the disk, and in response to the examiner's rejection of all claims the applicants emphasized a "significant feature" of the "fixed head which serves as a positional reference." As we observed *supra*, the doctrine of claim differentiation does not allow unrestrained expansion

of claims beyond the description of the invention on the specification, and explanations and representations made to the PTO in order to obtain allowance of the claims. See *Autogiro*, 384 F.2d at 399, 155 USPQ at 703-04.

Tandon also argues that the Commission's reliance on penetration by the transducer was in error in that it was based on an impermissible comparison of Tandon's commercial embodiments with the alleged infringing devices, rather than the correct procedure of applying the claims to the accused devices. *Amstar Corp. v. Envirotech Corp.*, 730 F.2d 1476, 1481-82, 221 USPQ 649, 653 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 924 [224 USPQ 616] (1984). The Commission, criticizing the ALJ for having made this error, explicitly disclaimed having based its final determination on a comparison of devices.

[3] The Commission's finding is, on this record, adequately supported by substantial evidence that the way the Mitsubishi devices work is not substantially the same as that defined in the claims. Thus we affirm the Commission's determination that the Mitsubishi drives have not been proven to infringe the claims of the '573 patent literally or under the doctrine of equivalents.

Procedural Error

Tandon asserts that the Commission erred in striking Tandon's designation of and reliance on certain deposition testimony in its reply brief. Tandon had designated before the ALJ certain portions of the inventors' testimony, which designated portions were included in the record before the Commission. Tandon's argument is that after Mitsubishi filed its brief before the Commission it became necessary to enlarge the designation. This the Commission rejected as contrary to its rules, which provide that the record before the Commission shall not be enlarged beyond that before the ALJ.

The Commission did refer to the inventors' testimony in connection with its decision as to the meaning of "fixed" in the '573 specification and claims. However, Tandon has not demonstrated a sufficient basis for the extraordinary relief requested. We discern no arbitrary ruling or abuse of the Commission's discretion, and decline to require that the Commission reopen proceedings on this basis.

AFFIRMED.

FN1 A floppy disk is a thin pliant magnetic disk capable of storing computer information.

FN2 A "gimbal" is defined as "a device that permits a body to incline freely in any direction . . ." *Webster's Ninth New Collegiate Dictionary* 517 (1984). The ALJ found that in the disk drive industry "the term 'gimbaled' . . . means a suspension system . . . that allows the head to pitch and roll."

FN3 Movement of the heads is expressed in relation to a standard three- dimensional coordinate system comprising an "X-axis", a "Y-axis", and a "Z- axis". The disk spins in a plane defined by the X and Y axes. Up-and-down movement occurs in the direction of the Z-axis, that is, perpendicular or "normal" to the plane of the disk. Movement about the X and Y axes is referred to as "pitch" and "roll" motion.

FN4 Mitsubishi model MF 353 is stated by Mitsubishi not to have a load or pivot point. This model was not

treated separately in the Commission's decision, and infringement has not been separately pressed by Tandon.

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Briefs and Other Related Documents (Back to top)

. 1986 WL 732837 (Appellate Brief) Reply Brief for Appellant (Jul. 17, 1986)

. 1986 WL 732838 (Appellate Brief) Brief for Intervenor/Appellees (Jul. 03, 1986)

. 1986 WL 732836 (Appellate Brief) Brief for Appellant (May. 23, 1986)

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